

Service Manual

PIONEER
The Art of Entertainment



ORDER NO.
CRT1736

MULTI-CD CONTROL DSP TUNER CD DECK AMPLIFIER

FH-P80

ES

COMPACT
disc
DIGITAL AUDIO

NOTE:

- Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.
"Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
- See the separate manual CX-631(CRT1640) for the cassette mechanism description.
- The cassette mechanism employed in this model is one of X-2L series
- See the service manual CX-540(CRT1574) for the CD mechanism description, disassembly and circuit description.
+4173
- The CD mechanism employed in this model is one of CX-569 series.

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● Service Precautions

1. For pickup unit(CGY1031) handling, please refer to "Disassembly"(CX-540 Service Manual CRT1574).
During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.
- 3 This device employs an inverter as the power supply for the EL. The inverter has an output voltage reach approximately 300 volts (AC), under no-load condition and about 190 volts (AC), with the EL connected. Utmost care should be used not to suffer from a possible electric shock, accordingly.
- 4 Whenever the amplifier may be put into operation, a heat sink should be mounted. ICs and transistors may be damaged if the amplifier should be put into operation without mounting any heat sink.

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SPECIFICATIONS - CONTINUED

■ Equalizer amp common section

Maximum current consumption	8.6 A
Maximum power output	35 W x 4
Rated power output	15 W x 4 (1 kHz, 1%) Continuous power output is 15 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.
Subwoofer	Cut-off frequency: 50 Hz, 80 Hz or 125 Hz Cut-off slope: -18 dB/OCT Gain: ± 12 dB
Tone controls (parametric)	Bass frequency: 80 Hz, 125 Hz, 200 Hz, 315 Hz Treble frequency: 12.5 kHz, 8 kHz, 5 kHz, 3.2 kHz Equalization range: ± 12 dB
3-band parametric equalizer	Frequency: 20 kHz, 12.5 kHz, 8 kHz, 5 kHz, 3.2 kHz, 2 kHz, 1.3 kHz, 800 Hz, 500 Hz, 315 Hz, 200 Hz, 125 Hz, 80 Hz, 50 Hz, 31.5 Hz, 20 Hz Equalization range: ± 12 dB
Loudness contour	10 dB (100 Hz) 7 dB (10 kHz) (Volume: -30 dB)
Load impedance	4 Ω (4 Ω - 8 Ω allowable)
Pre-out output	Maximum output level: 500 mV Output impedance: 1 k Ω
Power source	14.4 V DC (10.8 - 15.1 V allowable)
Grounding system	Negative type
Dimensions	Installed: 178 (W) x 100 (H) x 155 (D) mm Nose: 170 (W) x 95 (H) x 22 (D) mm
Weight	2.7 kg (including cord unit)

• Specifications and external appearance are subject to change without notice. Products purchased may differ in details from illustrations in this manual.

SPECIFICATIONS

■ Built-in CD player

System	Compact disc audio system
Usable discs	Compact discs
Signal format	Sampling frequency 44.1 kHz Number of quantization bits 16-bit linear
Frequency characteristics	5 - 20,000 Hz (± 1 dB)
Signal-to-noise ratio	94 dB (1 kHz) (IEC-A network)
Dynamic range	90 dB (1 kHz)
Number of channels	2 (stereo)

■ Tape deck

Usable cassette tapes	Compact cassette tape (C-30 - C-90)
Tape speed	4.76 cm/sec. (+0.14 cm/sec., -0.05 cm/sec)
Fast forward/rewind time	Approx. 100 sec. for C-60
Wow and flutter	0.09% (WRMS)
Frequency response	Metal: 30 - 19,000 Hz (± 3 dB)
Stereo separation	45 dB
Signal-to-noise ratio	Metal: Dolby C NR IN: 73 dB (IEC-A network) Dolby B NR IN: 67 dB (IEC-A network) Dolby NR OUT: 61 dB (IEC-A network)

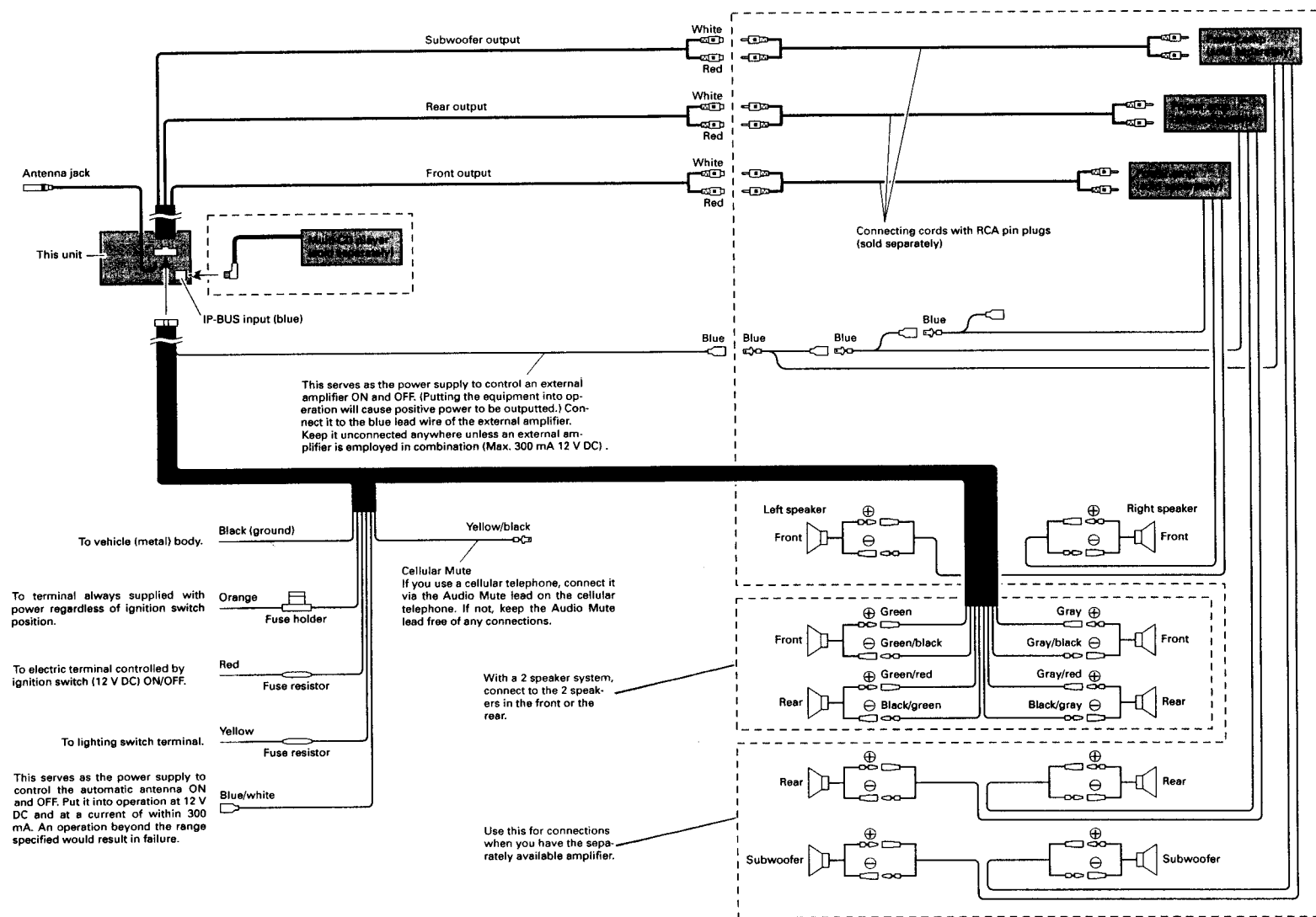
■ FM tuner

Frequency range	87.5 - 108 MHz
Effective sensitivity	11 dBf (0.8 μ V/75 Ω , monaural, S/N: 30 dB)
50 dB quieting sensitivity	16 dBf (1.1 μ V/75 Ω , monaural)
Signal-to-noise ratio	70 dB (IEC-A network)
Distortion	0.3% (at 65 dBf input, 1 kHz, stereo)
Frequency response	30 - 15,000 Hz (± 3 dB)
Stereo separation	40 dB (at 65 dBf input, 1 kHz)

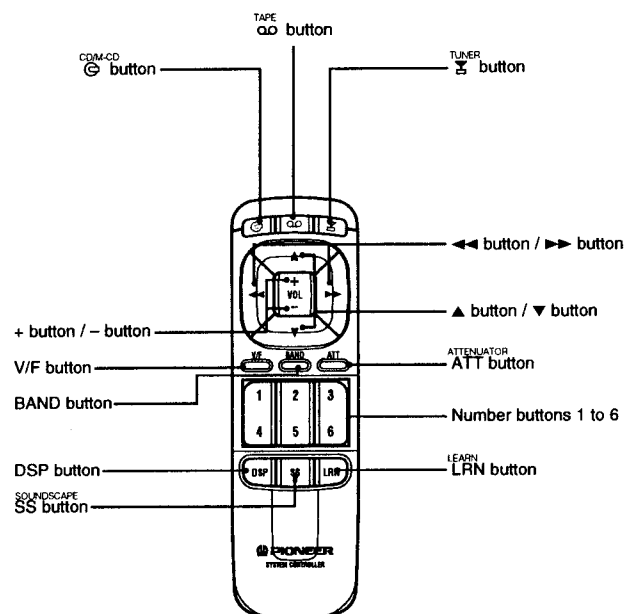
■ AM tuner

Frequency range	531 - 1,602 kHz (9 kHz) 530 - 1,710 kHz (10 kHz)
Effective sensitivity	18 μ V (at 25 dB) (S/N: 20 dB)
Selectivity	50 dB (± 9 kHz) 50 dB (± 10 kHz)

Connection Diagram

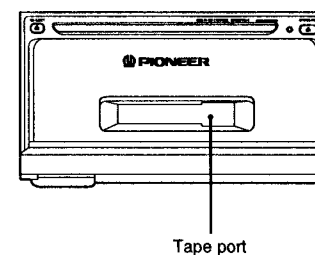
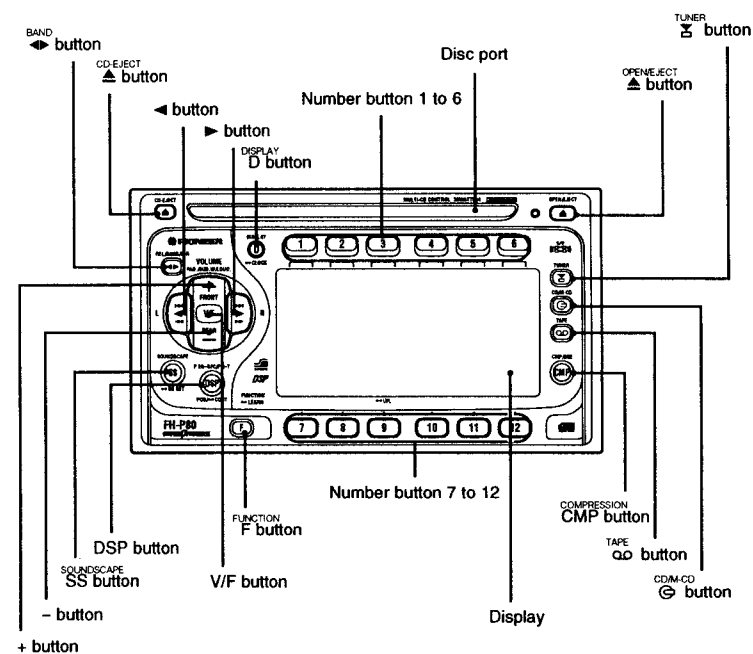


2. OPERATIONS AND CONNECTION



NAMES AND PARTS

The names of the operating buttons of this unit are as follows:



1

This feature allows you to lower the volume at a single touch such as when conversation in the car is hard to hear or when you are stopping at a toll booth.

2

This feature allows you to adjust the audio balance of the speakers front and rear and left and right.

3

OPTION

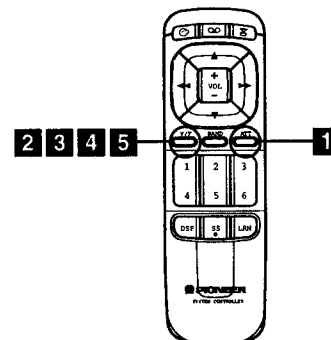
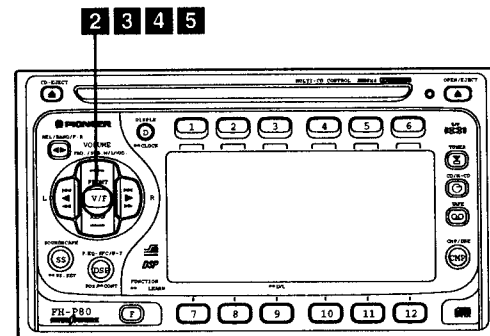
This feature allows you turn subwoofer output on and off and to adjust the output level.

4

This feature allows you to compensate for apparent lack of low and high frequencies when listening at low volume.

5

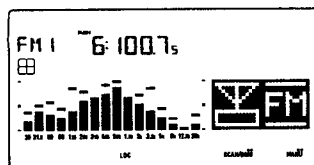
This feature compensates for differences in audio when switching the sound source.



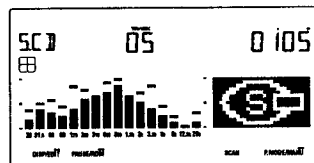
● Adjusting the Audio

You can check that the sound source has been switched by looking at the display.

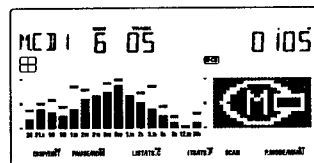
Radio (FM/AM)



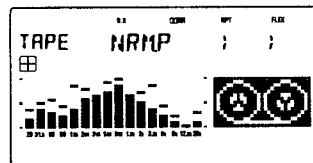
Built-in CD player



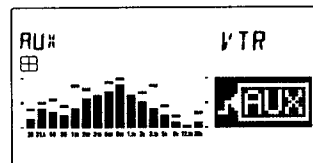
Multi-CD player



Tape deck



AUX (external device)



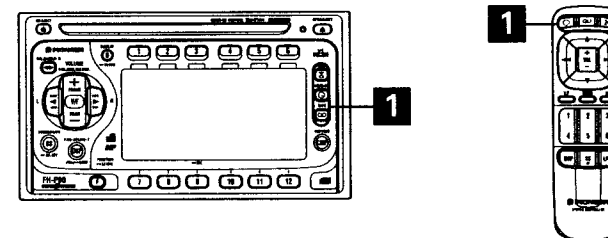
MEMO

- You cannot switch to a sound source that is not connected.
- You cannot switch to the built-in CD player if no disc has been loaded in the built-in CD player.
- You cannot switch to the multi-CD player if no magazine has been loaded in the multi-CD player.
- You cannot switch to the tape deck if no tape has been loaded in the tape deck.

- You cannot switch the sound source to AUX using the remote controller.
- You cannot switch to the AUX source if the AUX source (external device) is not set to ON.
- For details on connecting external devices such as video or DAT decks.

SWITCHING THE SOUND SOURCE

Switching to the desired sound source.



1 Switching the sound source

■ Press the **⏮** button when switching radio.

The sound source will be switched as follows each time the button is pressed.

→ Radio (FM/AM) → OFF

■ Press the **⏭** button when switching between built-in CD player and multi-CD player.

The sound source will be switched as follows each time the button is pressed.

→ Built-in CD player → Multi-CD player → OFF

■ Press the **⏮** button when switching between tape deck and AUX.

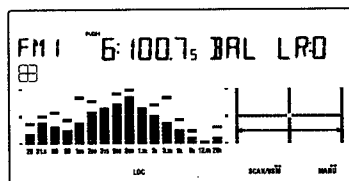
The sound source will be switched as follows each time the button is pressed.

→ Tape deck → AUX (external device) → OFF

3

Adjusting the balance

- Enhance left speaker sound by pressing the ◀ button on the main unit or the ◀◀ button on the remote controller.
Left speaker sound will be enhanced each time this button is pressed.
- Enhance right speaker sound by pressing the ▶ button on the main unit or the ▶▶ button on the remote controller.
Right speaker sound will be enhanced each time this button is pressed.



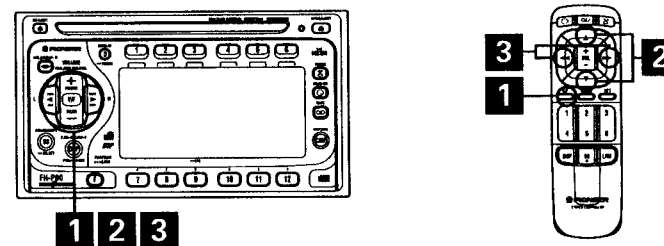
Balance can be adjusted within the range "L:25" to "R:25".

MEMO

- Adjustment mode will be cancelled if no operation occurs within 8 seconds.
- For those using 2-speaker systems, be sure to set "FAD FR:0".
- The fader/balance can be set at each position of the listening position setting. Selecting a position at the listening position setting brings up the lastly forced fader/balance values.

FADER/BALANCE ADJUSTMENT

This feature adjusts the audio balance of the front speakers and rear speakers or the audio balance of the right speakers and left speakers.

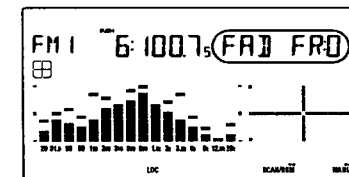


1

Selecting adjustment mode

Press the [V/F] button.

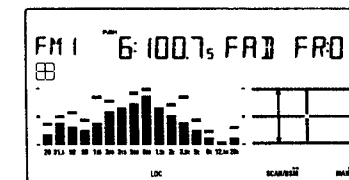
The unit will enter fader/balance adjustment mode.



2

Adjusting the fader

- Enhance front speaker sound by pressing the [+] button on the main unit or the ▲ button on the remote controller.
Front speaker sound will be enhanced each time this button is pressed.
- Enhance rear speaker sound by pressing the [-] button on the main unit or the ▼ button on the remote controller.
Rear speaker sound will be enhanced each time this button is pressed.



The fader can be adjusted within the range "F:25" to "R:25".

1

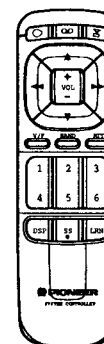
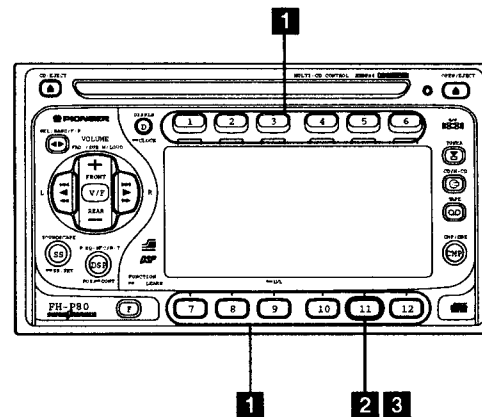
You can set your favorite station in the memory of any button you wish so you can call up that station anytime at a single touch.

2

This function automatically searches for stations having the strongest signals and sets them in memory. This is convenient when searching for stations with good reception when you arrive at your destination.

3

This feature calls up stations set in memory one after the other. This is useful when searching for a station to listen to or when checking which stations are set in memory.



● Listening to the Radio

1

This feature allows you to easily cue the current track or the next track. You can reverse or advance through as many tracks as you like by repeating this operation.

2

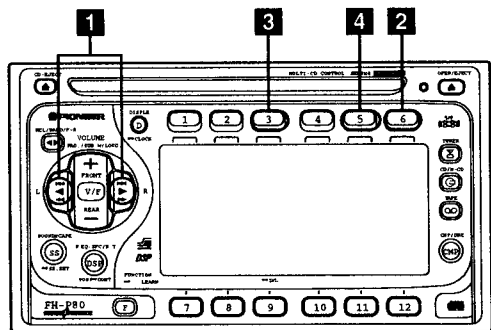
This feature corrects reduced quality in high frequencies so that even old tapes and poorly recorded tapes can be enjoyed with better sound quality.

3

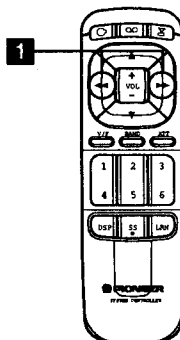
This feature skips blank parts on cassette tapes. It will automatically cue to the next track if the gap between two tracks is more than 12 seconds.

4

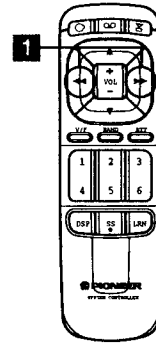
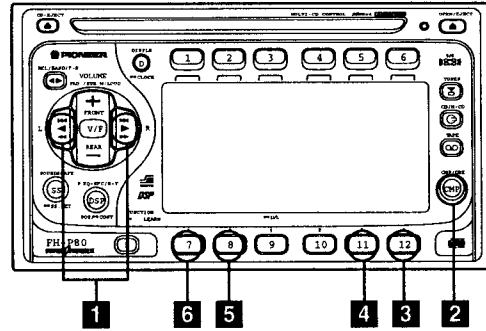
This feature allows you to listen to the same track repeatedly.



● Listening to a Cassette Tape



● Listening to the Built-in CD Player



5 This feature plays back the disc leaving the order of track selection up to the microcontroller. Enjoy listening to a disc in a different track order.

6 This feature allows you to enter a disc title and have that title be displayed when playing back that disc. Disc playback can be more enjoyable by entering a title you like.

1 This feature allows you to easily cue the current track or the next track.

2 The unit includes a COMP function for reducing the sound level differences by suppressing high level sounds and enhancing low level sounds. The unit also includes a DBE function for enhancing low frequencies which often seem lacking inside a car.

3 This feature allows you to listen to the same track repeatedly.

4 This feature allows you to listen to just the first part of each track on a disc in succession. This is useful when you want to know what is on a disc or are searching for a track you want to listen to.

1

This feature allows you to select the disc you want to listen to from all those set in the magazine at a single touch.

2

This feature allows you to easily cue the current track or the next track.

3

This effect is only available when you have connected a multi-CD player (such as the CDX-P2000) which includes a digital compression function. Such players include a COMP function for reducing the sound level differences by suppressing high level sounds and enhancing low level sounds. They also include a DBE function for enhancing low frequencies which often seem lacking inside a car.

4

This feature allows you to listen to the same track repeatedly. It is also possible to perform repeat playback at the disc level or multi-CD level.

5

This feature allows you to listen to just the first part of each track on a disc in succession. It is also possible to listen to the first part of the first track on each disc set in the magazine. This is useful when you want to know what is on a disc or are searching for a track you want to listen to.

6

This feature plays back the disc leaving the order of track selection up to the microcontroller. Enjoy listening to a familiar disk in a different track order.

7

Store only those tracks you want played back. This allows you to enjoy a disc by storing only those tracks you really like.

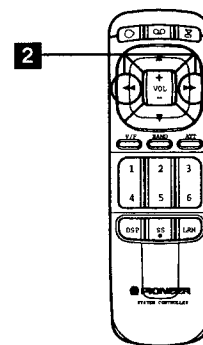
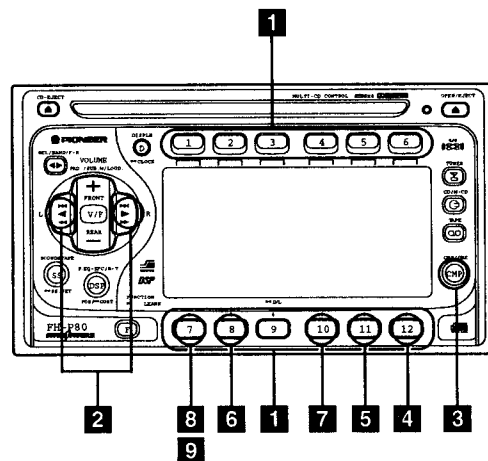
8

This feature allows you to enter a disc title and have that title be displayed when playing back that disc. Disc playback can be more enjoyable by entering a title you like.

9

This feature allows you to display the registered disc titles for each disc one by one and select discs for playback by title.

You can also enjoy CDs played on a multi-CD player when a multi-CD player such as a CDX-P2000 is connected.



Listening to the Multi-CD Player

Soundscape function

The Soundscape function allows two sources to be played simultaneously. By playing the main source (music) and subsource (sound effects) simultaneously, it becomes as if you were in the place represented by the sound effects. "Music plus sound effects" allows you to enjoy a new sound field with increased realism.

1 Soundscape playback

It is possible to physically experience a whole new location by playing back two sources at once (music and sound effects). Through combined use of a multi-CD player, it is possible to insert sound effects into a track played on the multi-CD player or to insert sound effects in the gaps (blank space) between tracks.

- Only the built-in CD player can be used for the subsource.

2 Subsource volume adjustment

It is possible to adjust the volume of just the subsource (sound effects) while leaving the volume of the main source (music) alone.

3 Sound effect selection

It is possible to select and store a sound effect (track) to be played together with the main source.

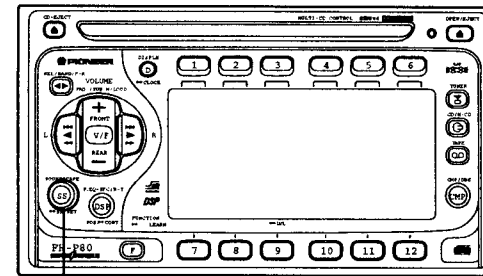
4 Sound effect storage

It is possible to select and store a sound effect (track) to be played in the gap between tracks.

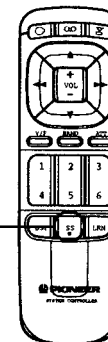
OPTION

5 multi CD player

It is possible to select and store a sound effect (track) to be played with each track of the main source.



1 2 3 4 5



1 2 3 4 5

Using Soundscape

FH-P80

1

A program which reproduces 6 typical sound fields including those found in concert halls and stadiums has been prepared. This allows you to experience a realistic sound field as if you were really in the location being reproduced.

2

Five equalizer curves suited to 5 different music genres including rock, pop and fusion have been prepared.

3

This feature allows you to more fully enjoy the music by correcting the equalizer curves to compensate for acoustical characteristics inside your car.

4

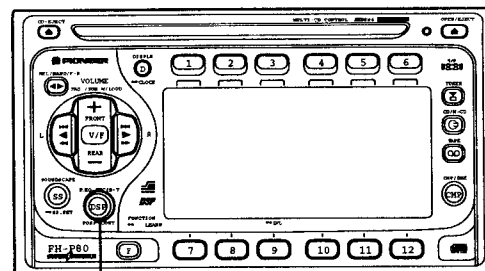
This feature allows you to freely adjust the level of the prepared equalizer curves at each separate frequency. You can also re-adjust an equalizer curve you have already changed. You can also adjust the frequency separately for front/rear speakers at 3 out of 16 points.

5

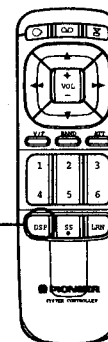
This feature allows you to make bass and treble adjustments independently for the front and rear speakers. For example, you can enhance the highs for the front speakers and the lows for the rear speakers to make clear vocals appear to be in a more forward location.

6

This feature allows you to select listening position. The delay time and level used for output from each speaker is automatically adjusted in accordance with the seat position and number of people selected.



1 2 3 4 5 6



1 2 3 4 5 6

● Using DSP

3. DISASSEMBLY

● Removing the Case

1. Insert and turn a flat screwdriver to remove the case.
2. Raise the case to remove.

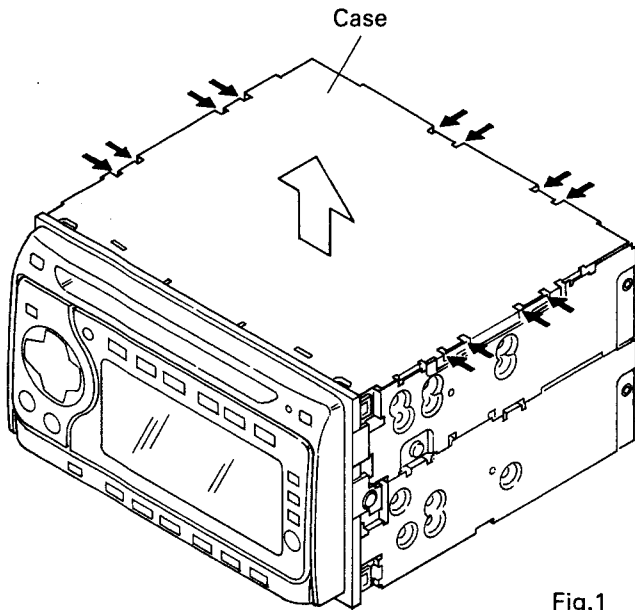


Fig.1

● Removing the Grille Assy

1. Remove the two screws A and three screws B.
2. Disconnect the two connectors.
3. Press the four tabs, and then pull out the grille assy.

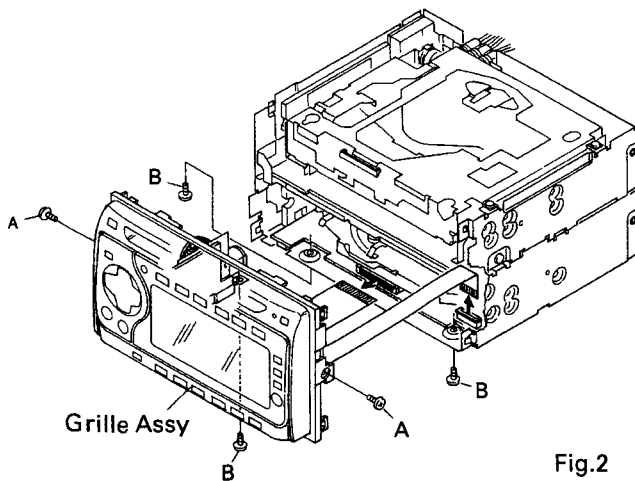


Fig.2

NOTE:

When reassembling the grille assy, use a pair of tweezers of the like to keep holding the flexible P.C.Board so that it will enter under the cassette mechanism module.

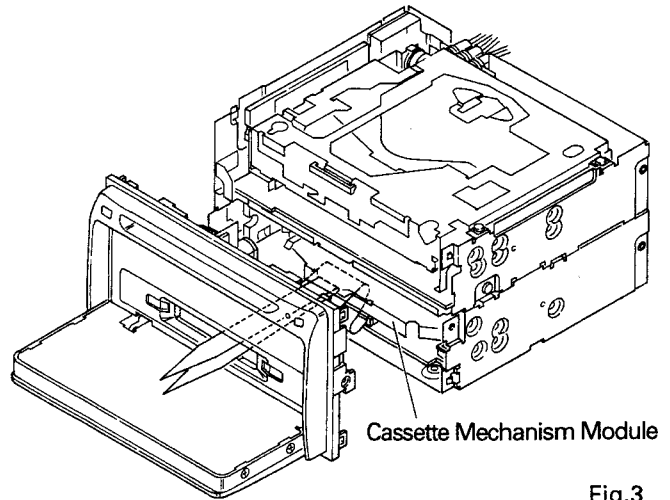


Fig.3

● Removing the Operation Flap Section

1. Remove the two springs and two washers.
2. Remove the four screws.
3. Remove the operation flap section.

NOTE:

Use utmost care to mount the spring while assembling the operation flap section.

*Operation flap = Open and close display

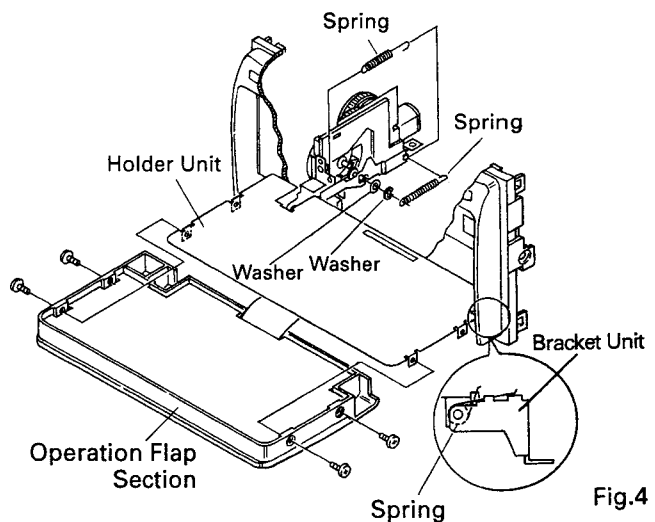


Fig.4

● Removing the Drive Assy

1. Remove the screw A and screw B.
2. Disconnect the connector.
3. Remove the drive assy.

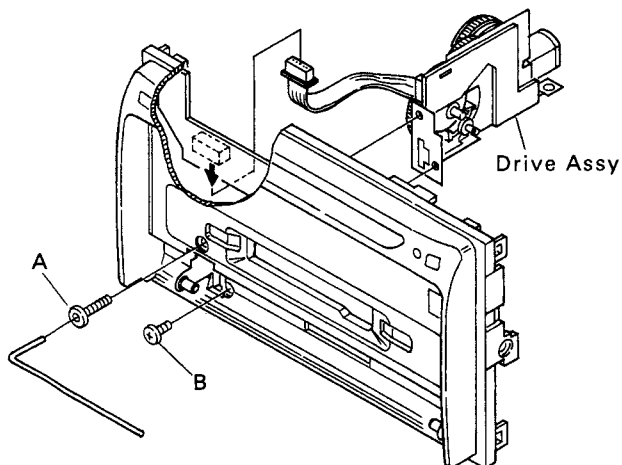


Fig.5

● Removing the Cover, Heat Sink and DSP Amp Assy

1. Disconnect the two connectors.
2. Remove the five screws A, and then remove the cover.
3. Remove the two screws B and three screws C.
4. Remove the heat sink and DSP amp assy.

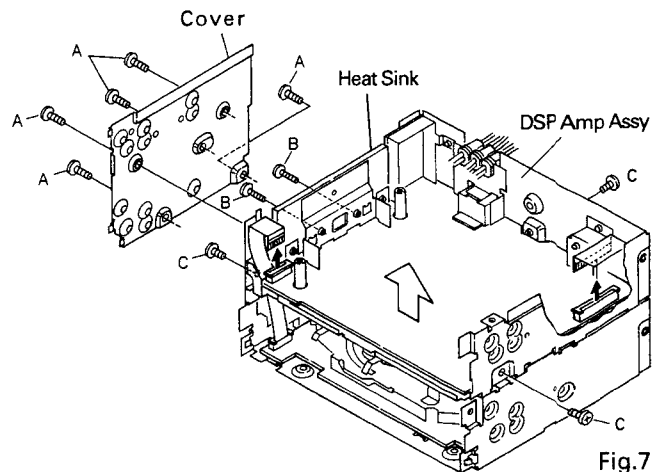


Fig.7

● Removing the CD Mechanism Module

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the CD mechanism module.

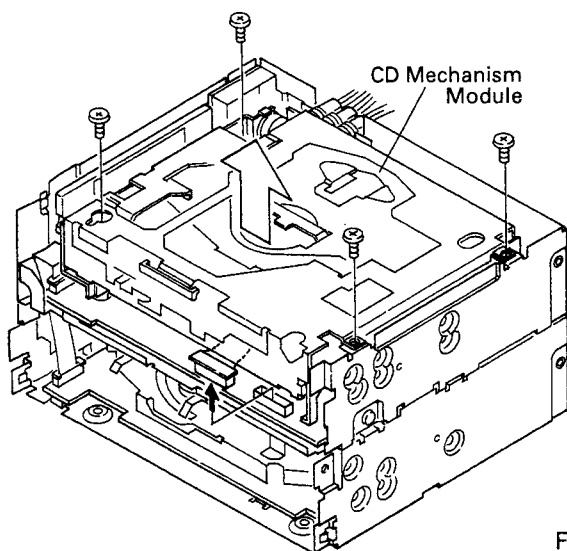


Fig.6

● Removing the DSP Amp Unit

1. Remove the four screws.
2. Unbend the tabs at four locations indicated by arrows until straight.
3. Raise up on DSP amp unit to remove it from chassis unit.

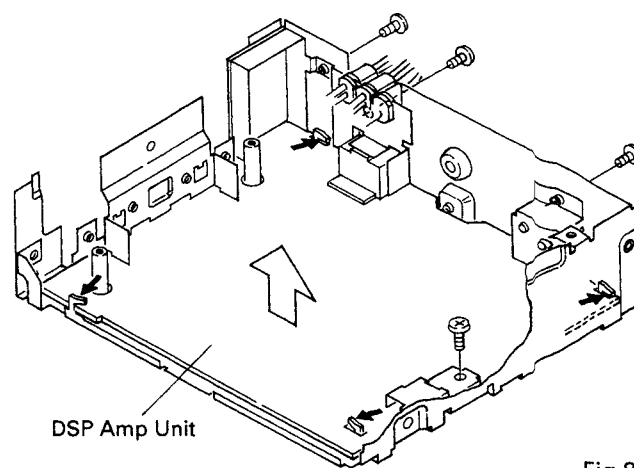


Fig.8

● **Removing the Cassette Mechanism Module**

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the cassette mechanism module.

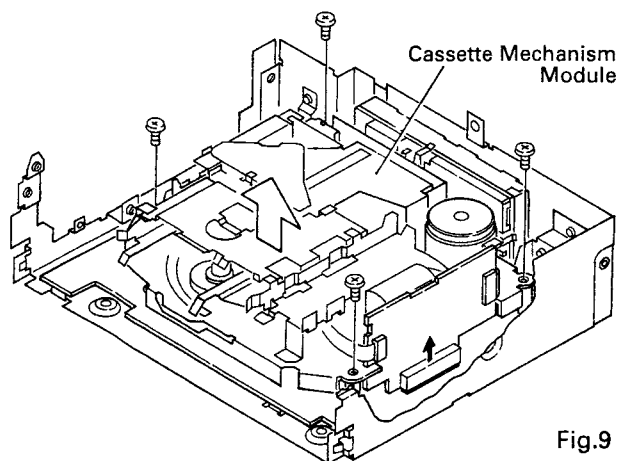


Fig.9

● **Removing the Deck Tuner Unit**

1. Remove the four screws.
2. Unbend the tabs at four locations indicated by arrows until straight.
3. Raise up on deck tuner unit to remove it from chassis unit.

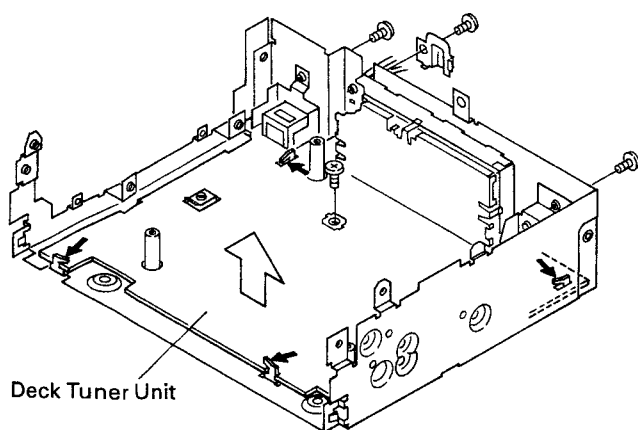


Fig.10

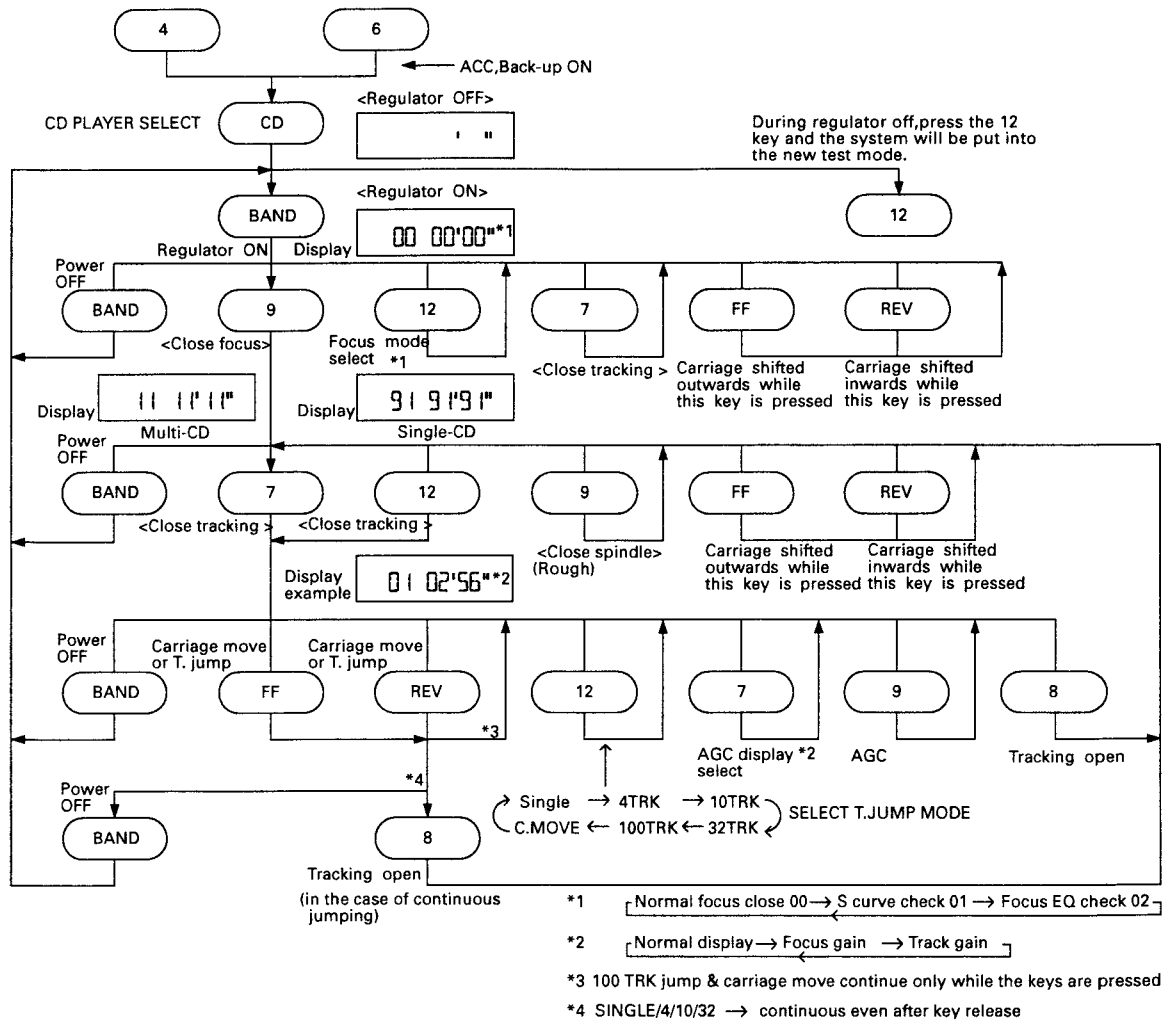
4. ADJUSTMENT

4.1 CD PLAYER SECTION

1)Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO1(approx. 2.5V) instead of GND.
If REFO1 and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
Do not connect the negative probe of the measuring equipment to REFO1 and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO1 with the channel 2 negative probe connected to GND.
Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
If by accident REFO1 comes in contact with GND, immediately switch the regulator or power OFF.
- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.
- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.
- Test mode starting procedure
Switch ACC, back-up ON while pressing the 4 and 6 keys together.
- Test mode cancellation
Switch ACC, back-up OFF.
- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit. Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
*During PLAY, even if the eject button is pressed, the disc will not be ejected and the unit will remain in the PLAY mode.
*The unit will not load a disc.
When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.
- When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing another key. Otherwise, there is a risk of the actuator being destroyed.
- Turn power off when pressing the button FF or the button REV key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)
- SINGLE/4TRK/10TRK/32TRK will continue to operate even after the key is released. Tracking is closed the moment C-MOVE is released.
- JUMP MODE resets to SINGLE as soon as power is switched off.

Flow Chart



Measuring Equipment and Jigs

Adjustment	Measuring equipment & jigs
1 Tracking Error Offset Adjustment 1	DC V Meter Extension cable:GGD1057
2 Grating Check / Adjustment 1	Oscilloscope, ABEX TCD-784, Two L.P.F., Clock Driver Extension cable:GGD1057
3 Grating Adjustment 2	Oscilloscope, Grating Adjustment Filter (B.P.F.), mV Meter, ABEX TCD-784, Two L.P.F., Clock Driver Extension cable:GGD1057
4 Tracking Balance Adjustment 1	Oscilloscope, L.P.F., ABEX TCD-784 Extension cable:GGD1057
5 Focus Bias Adjustment	Oscilloscope, ABEX TCD-784 Extension cable:GGD1057
6 RFO1 Offset Adjustment	Oscilloscope, ABEX TCD-784 Extension cable:GGD1057
7 Tracking Error Offset Adjustment 2	DC V Meter Extension cable:GGD1057
8 Tracking Balance Adjustment 2	Oscilloscope, L.P.F., ABEX TCD-784 Extension cable:GGD1057

● Adjustment Point

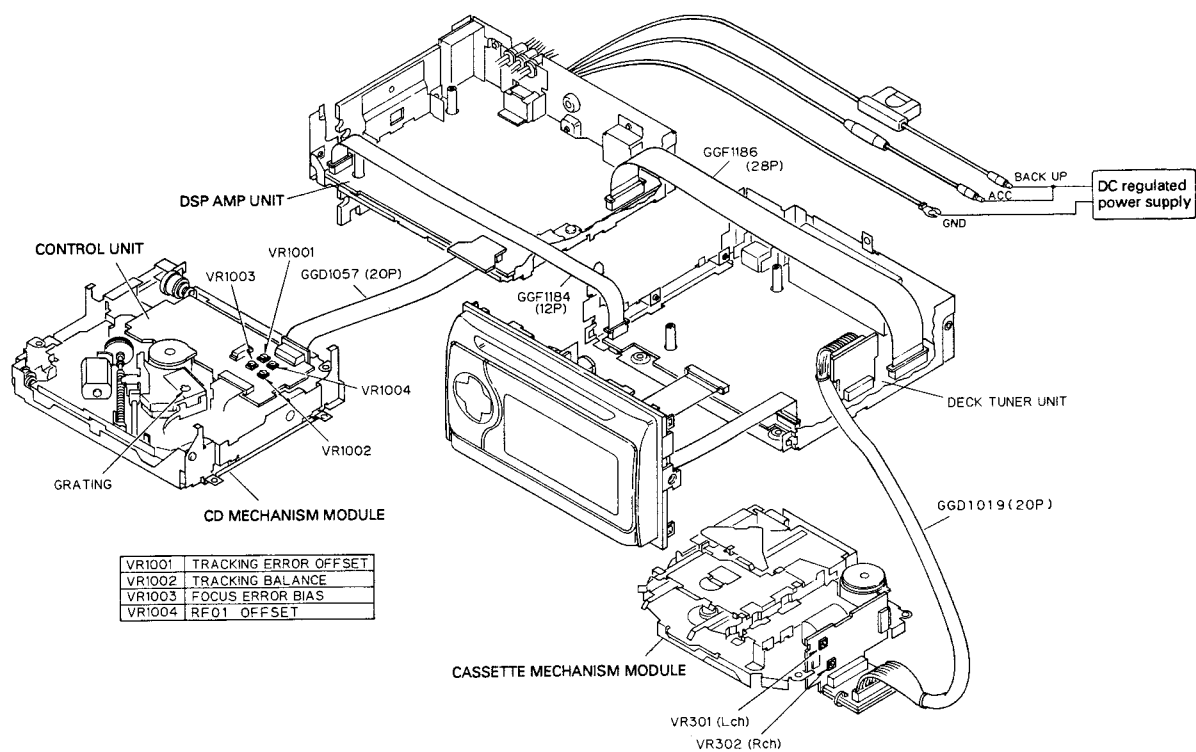


Fig.11

● Test Point

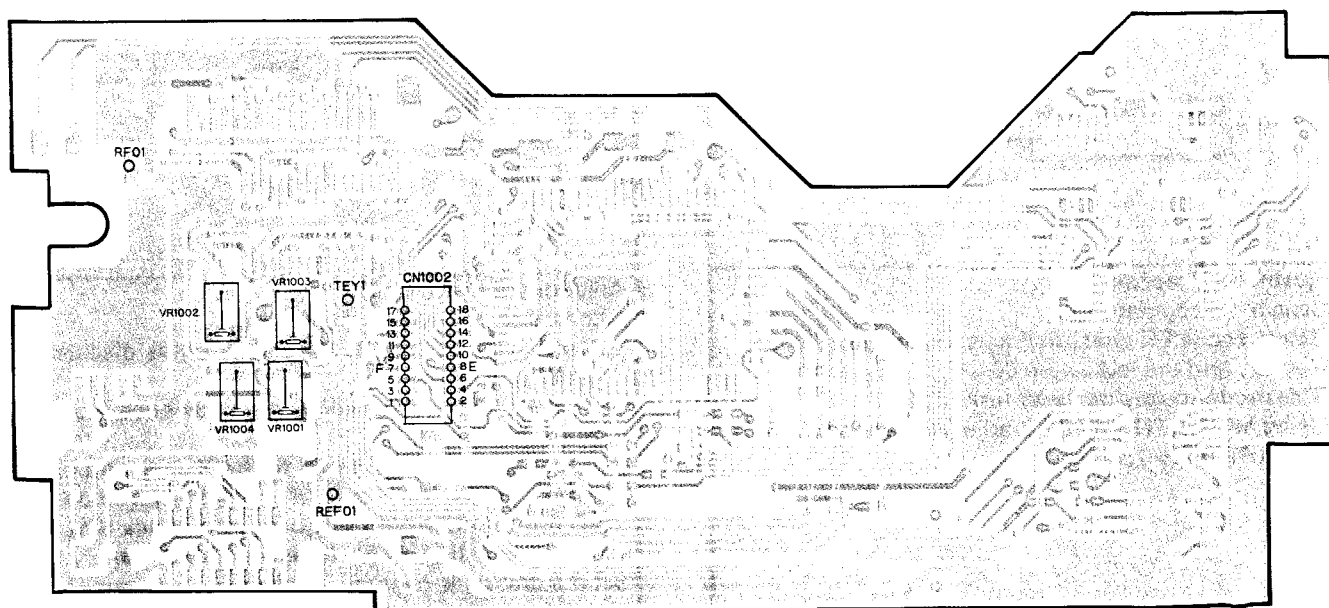


Fig.12

1 Tracking Error Offset Adjustment 1

·Purpose :

To adjust the offset of the tracking pre-amp to zero.

·Symptoms of Mal-adjustment :

Track search NG, carriage runaway, poor playability.

·Measuring

·DC V Meter, GGD1057

Equipment / Jig

·Measuring Point

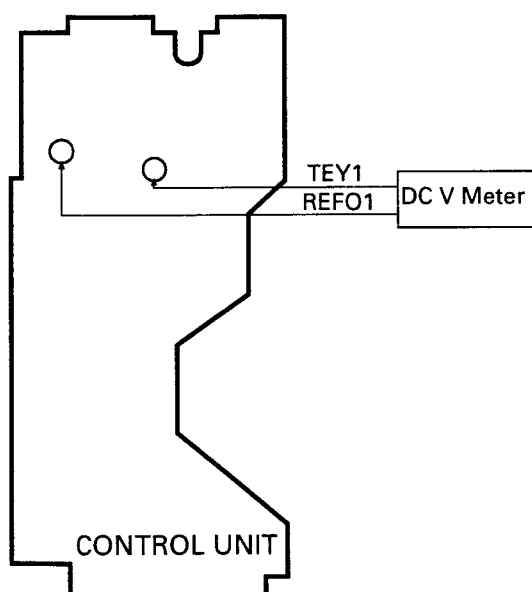
·TEY1

·Test Disc , Mode

·TEST MODE

·Adjustment Point

·VR1001(TE OFFSET VR)



Adjustment Procedure

1.Switch the regulator on.

Select Focus EQ check in Focus mode by pressing Key **12**. And the indication 00 will change to 02.

This mode makes the laser turned off.

2.Using VR1001(TE OFFSET) adjust DC voltage of TEY1 from REFO1 to $0 \pm 25\text{mV}$.

2 Grating Check / Adjustment 1

·Purpose :

To check that the PU grating is correctly aligned after the PU unit has been replaced.

·Symptoms of Mal-adjustment :

Unable to play disc, track skip during search, search NG.

·Measuring

·Oscilloscope, Two L.P.F.,

Equipment / Jig

Clock Driver, GGD1057

·Measuring Point

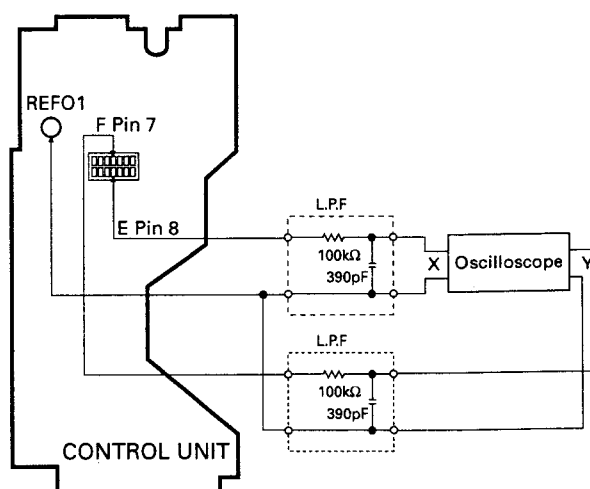
·E, F

·Test Disc , Mode

·ABEX TCD-784, TEST MODE

·Adjustment Point

·Grating hole



Adjustment Procedure

1.Load disc and switch regulator on.

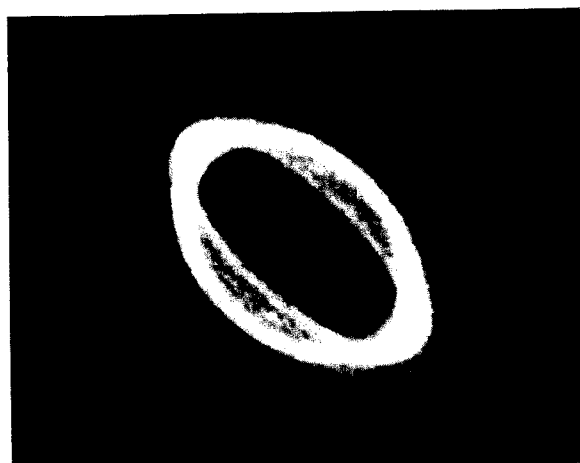
2.Position the PU unit in the center of the disc using the **FF & REV** keys.

3.Press key **9** to close focus and press once more to close spindle.

4.Input the L.P.F. output of E to the X axis, and L.P.F. output of F to the Y axis of an oscilloscope by the AC mode, observe lissajous, and check that the grating is within $\pm 45^\circ$. (See Waveform 1-3)

5.If the grating is over 45° , make a fine adjustment by slowly turning the screwdriver, so that the lessajous is in line. If, however during the adjustment the screwdriver should be turned too much and the lessajous should become out of line, proceed to the next grating adjustment 2.

Lissajous figure (AC input)
Horizontal axis E 10mV/div.
Vertical axis F 10mV/div.



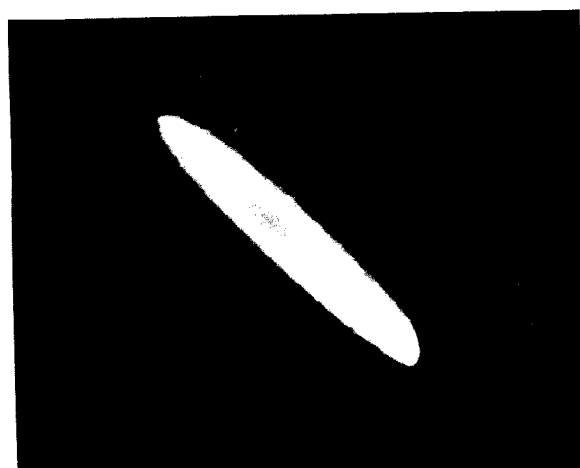
60°=NG

Waveform 1



45°=OK
(Limit)

Waveform 2

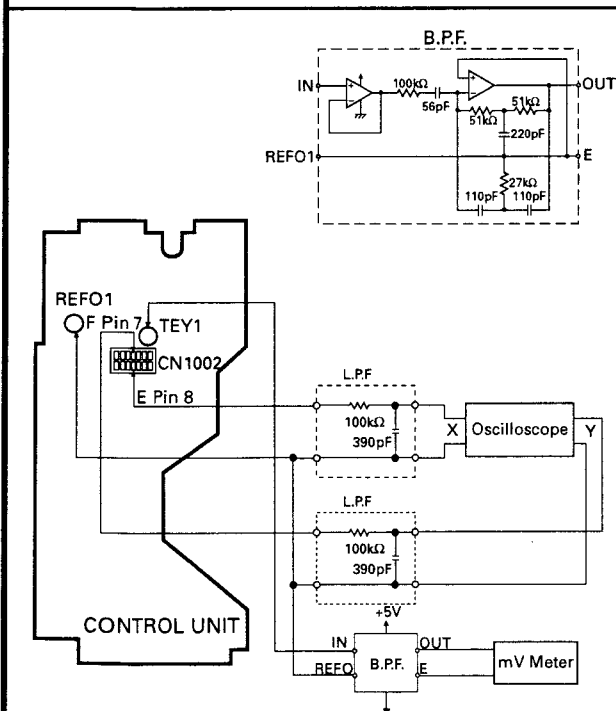


0°=BEST
(Doesn't become
a single line due
to eccentricity)

Waveform 3

3 Grating Adjustment 2

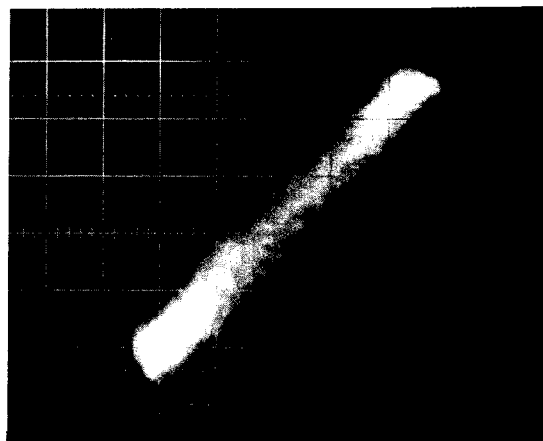
Purpose : This needs to be done if the previous adjustment was unsuccessful.	
Symptoms of Mal-adjustment : Unable to play disc, track skipping, track search NG.	
Measuring Equipment / Jig	· Oscilloscope, Grating Adjustment filter (B.P.F.), mV Meter, Two L.P.F., Clock Driver, GGD1057
Measuring Point	· TEY1, E, F
Test Disc , Mode	· ABEX TCD-784, TEST MODE
Adjustment Point	· Grating hole



Adjustment Procedure

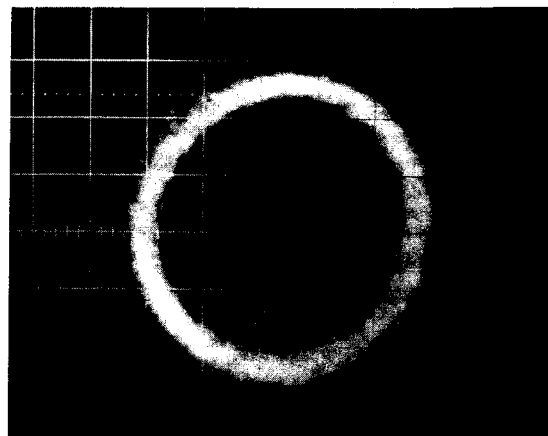
1. Load disc and switch regulator on.
2. Position the PU unit in the center of the disc using the **FF** & **REV** keys.
3. Press key **9** to close focus and press once more to close spindle.
4. While observing the TEY1 filter output using an AC mV meter, use a screwdriver to slowly turn the grating hole.
The AC level, should become larger or smaller by turning the grating hole , try to find the minimum level point.
(This is where the grating is in line on track, and is the "null point".)
5. Turn the screwdriver clockwise from the null point (from the PU under side), so that the lissajous is in line as much as possible.

Null Point=180°
 Lissajous figure (AC input)
 Horizontal axis E 10mV/div.
 Vertical axis F 10mV/div.



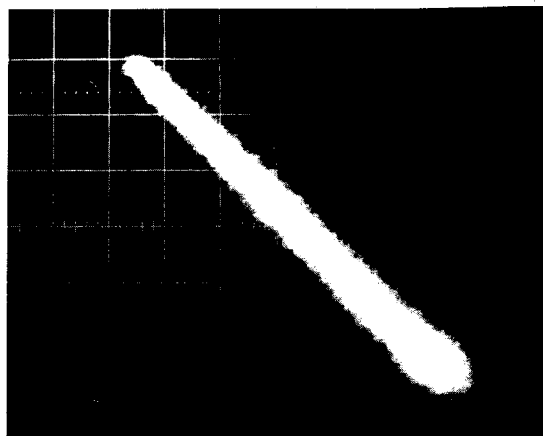
Waveform 4

"Rough" adjustment=90°



Waveform 5

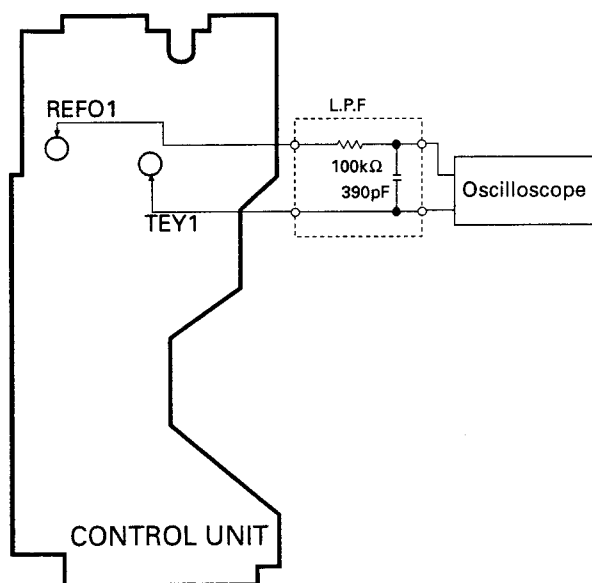
Final adjustment=0°



Waveform 6

4 Tracking Balance Adjustment 1

Purpose : To equate the sensitivity of the F channel to that of the E channel.	
Symptoms of Mal-adjustment : Track search NG, poor playability, carriage runaway.	
Measuring Equipment / Jig	· Oscilloscope, L.P.F., GGD1057
Measuring Point	· TEY1
Test Disc , Mode	· ABEX TCD-784, TEST MODE
Adjustment Point	· VR1002 (T.BAL VR)

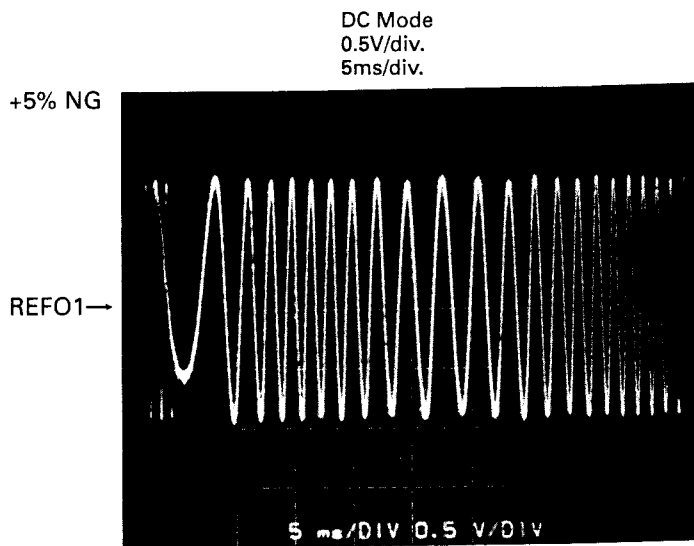


Adjustment Procedure

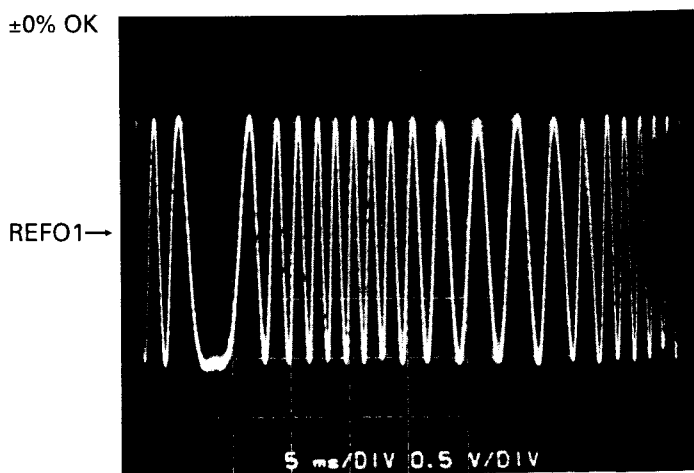
1. Load disc and switch the regulator on.
2. Position the PU unit in the center of the disc using the FF & REV keys.
3. Close focus by pressing key 9.
4. Observing the TEY1 waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (see waveform 7-9).

Check

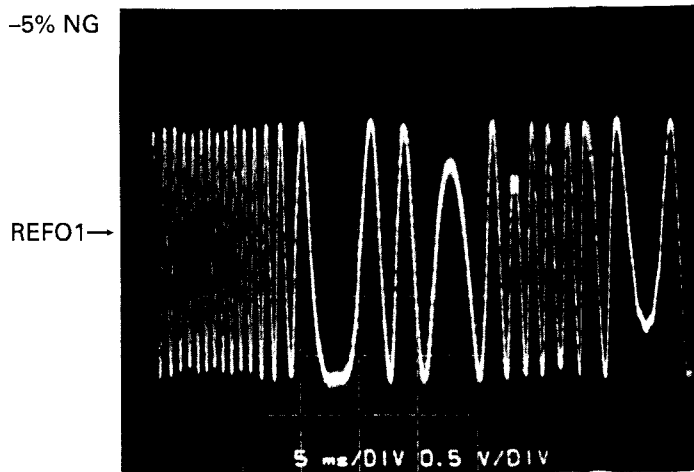
After adjustment the TEY1 waveform should have an amplitude of 1.5 ± 0.65 Vpp. (ABEX TCD-784) (Providing focus bias is OK)



Waveform 7



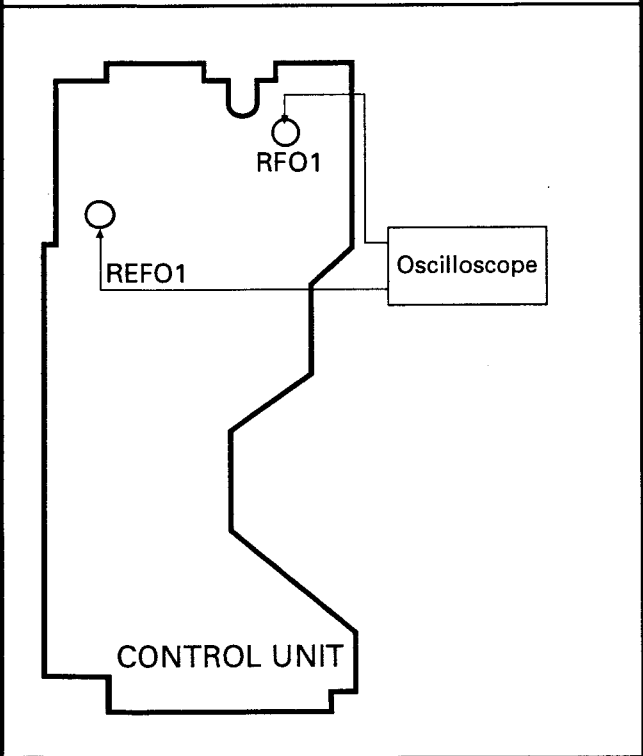
Waveform 8



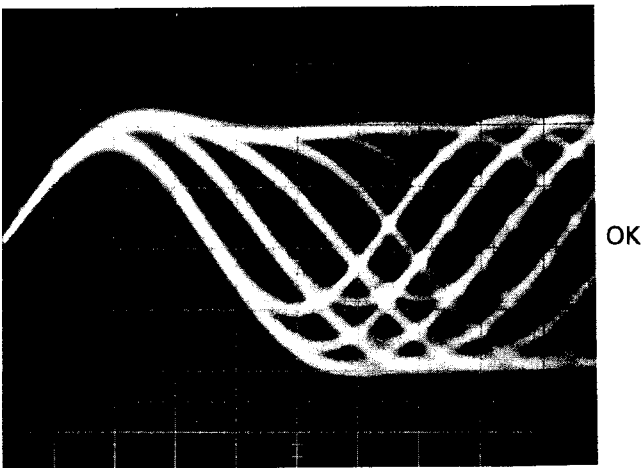
Waveform 9

5 Focus Bias Adjustment

Purpose : To adjust the focus servo reference so that the RF waveform is an optimum.	
Symptoms of Mal-adjustment : Difficulty in closing focus, poor playability.	
Measuring Equipment / Jig	· Oscilloscope, GGD1057
Measuring Point	· RFO1
Test Disc , Mode	· ABEX TCD-784, NORMAL MODE
Adjustment Point	· VR1003 (FE BIAS VR)



Adjustment Procedure	
1. Play track number 18.	
2. Observe the RFO1 from REFO1 on an oscilloscope, and adjust VR1003(FE BIAS) so that the RF waveform is maximum and eye pattern is optimum. (See waveform 10, 11)	
Check	
After adjustment the RFO1 waveform should have an amplitude of 1.7 ± 0.65 Vpp.(ABEX TCD-784)	



Waveform 10



AC Mode Before adjustment Waveform 11

6 RFO1 Offset Adjustment

•Purpose

To adjust the RFO1 waveform offset to an optimum.

•Symptoms of Mal-adjustment

Difficulty in closing focus, poor playability.

•Measuring

Equipment / Jig

•Oscilloscope, GGD1057

•Measuring Point

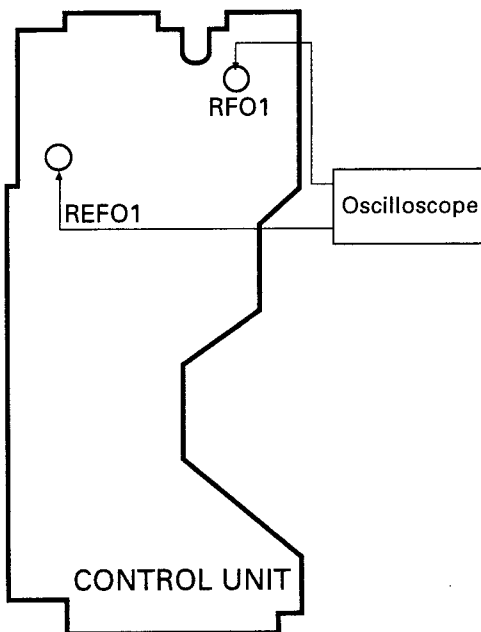
•RFO1

•Test Disc , Mode

•ABEX TCD-784,
NORMAL MODE

•Adjustment Point

•VR1004 (RFO1 OFFSET VR)



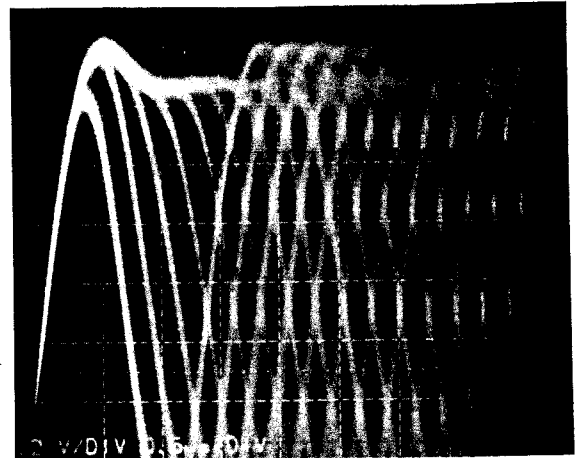
Adjustment Procedure

1. Play track number 18.
2. Adjust VR1004 so that the peak value of the upper envelope of the RFO1 waveform is at +1.1VDC w.r.t. REFO1 (See waveform 12-14).

+100mV NG

REFO1→

DC Mode
0.2V/div.
0.5μs/div.

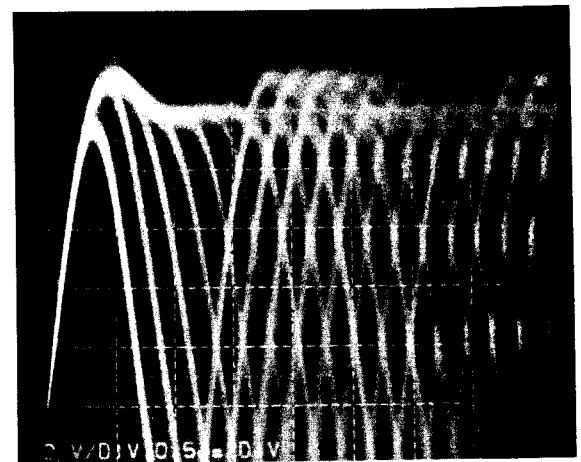


Waveform 12

OK

1.1V

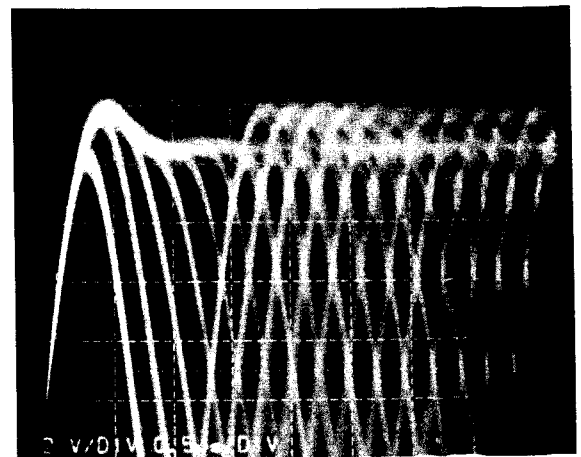
REFO1→



Waveform 13

-100mV NG

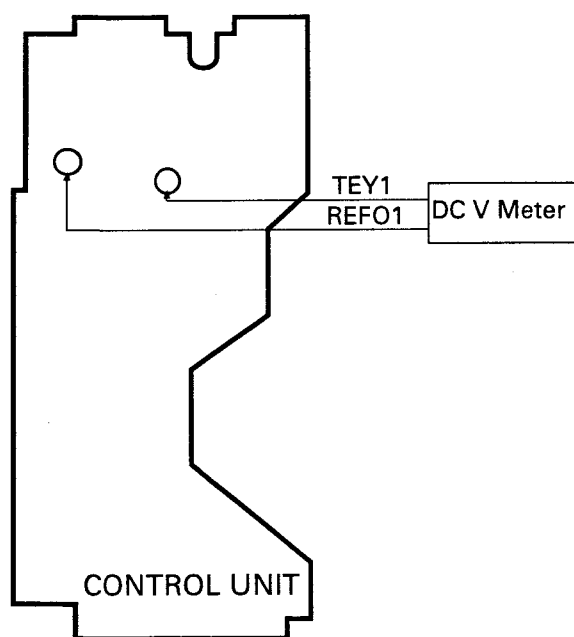
REFO1→



Waveform 14

7 Tracking Error Offset Adjustment 2

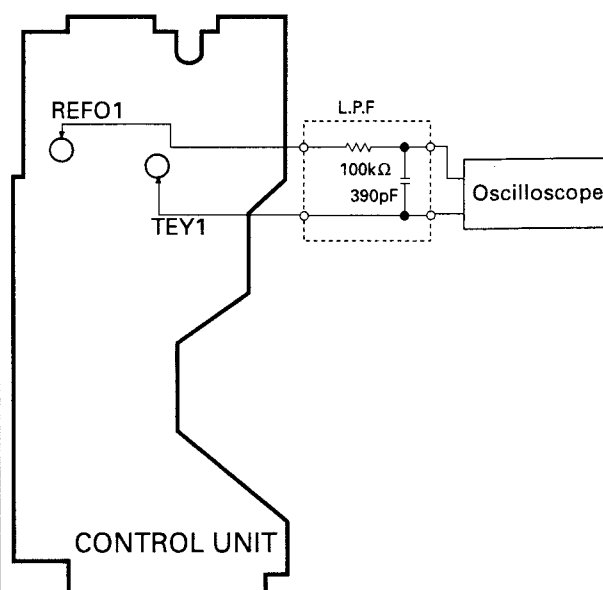
Purpose : To check the offset of the tracking pre-amp is zero and adjust if necessary.	
Symptoms of Mal-adjustment : Track search NG, carriage runaway, poor playability.	
Measuring Equipment / Jig	· DC V Meter, GGD1057
Measuring Point	· TEY1
Test Disc , Mode	· TEST MODE
Adjustment Point	· VR1001(TE OFFSET VR)

**Adjustment Procedure**

1. Switch the regulator on.
Select Focus EQ check in Focus mode by pressing Key 12. And the indication 00 will change to 02.
This mode makes the laser turned off.
2. Confirm that the DC voltage of TEY1 from REFO1 is $0 \pm 25\text{mV}$.
3. If not, readjust and proceed to tracking balance adjustment 2.

8 Tracking Balance Adjustment 2

Purpose : To equate the sensitivity of the F channel to that of the E channel. This needs only be done if the TE OFFSET volume was re-adjusted in the previous step.	
Symptoms of Mal-adjustment: Track search NG, poor playability, carriage runaway.	
Measuring Equipment / Jig	· Oscilloscope, L.P.F., GGD1057
Measuring Point	· TEY1
Test Disc , Mode	· ABEX TCD-784, TEST MODE
Adjustment Point	· VR1002 (T.BAL VR)

**Adjustment Procedure**

1. Load disc and switch the regulator on.
2. Position the PU unit in the center of the disc using the FF & REV keys.
3. Close focus by pressing key 9.
4. Observing the TEY1 waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (See waveform 7-9).

Check

After adjustment the TEY1 waveform should have an amplitude of $1.5 \pm 0.65 \text{ Vpp}$. (ABEX TCD-784)

4.2 TUNER SECTION

● Connection Diagram

NOTE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of SSG.

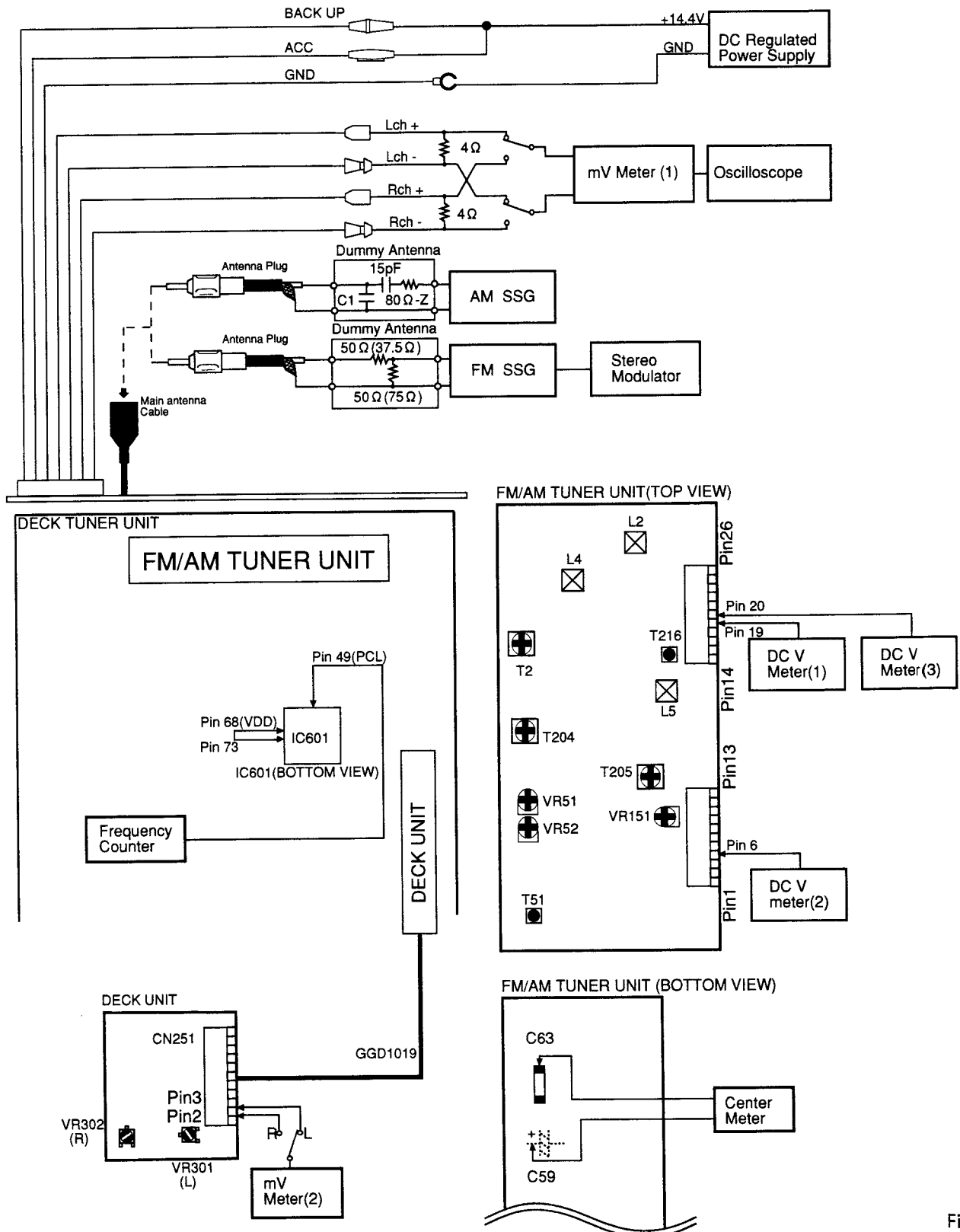


Fig.13

AM ADJUSTMENT (Tuning steps at 10kHz)

	No.	AM SSG(400Hz, 30%)		Displayed Frequency(kHz)	Adjustment Point	Adjustment Method (Switch Position)
		Frequency(kHz)	Level(dBμV)			
IF	1	1000	20	1000	T204,T205	mV Meter(1) : Maximum

FM ADJUSTMENT

Modulation M1:MONO MOD., 400Hz 100%(75kHz Dev.)

M2:MONO MOD., 400Hz 30%(22.5kHz Dev.)

S:STEREO MOD., 1kHz, L or R=30%(20.25kHz+7.5kHz Dev.)

NOTE:Before proceeding to further adjustments after switching power ON, let the tuner run for ten minutes to allow the circuits to stabilize.

	No.	FM SSG		Frequency(MHz)	Displayed Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dBf)			
TUN Volt	1	.....	.....	108.0	L5	DC V Meter(1) : 6.5V±0.1V
IF	1	98.1 M1	65	98.1	T51	Center Meter : 0
ANT,RF	1	89.9 M1	5	98.1	L2,L4	mV Meter(1) : Maximum
IFT	1	98.1 M2	5	98.1	T2	mV Meter(1) : Maximum
Soft	1	98.1 M1	65	98.1	.....	mV Meter(1) : A(0dB)(STEREO MODE)
Mute	2	98.1 M1	14	98.1	VR52	mV Meter(1) : A-3dB
ARC	1	98.1 S	39	98.1	VR151	mV Meter(1) : Separation 5dB (STEREO MODE)
SD	1	98.1 S	21	98.1	VR51	Oscilloscope(2) : Approx. 5V

DOLBY B/C NR ADJUSTMENT

No.	Test Tape	Adjustment Point	Adjustment Method (Switch Position)
1	NCT-150 (400Hz, 200nwb/m)	VR301(Lch), VR302(Rch)	mV Meter(2) : -6.0dBs(300mV)+1.5dB -0.5dB (DOLBY NR Switch : OFF)

CLOCK CONFIRMATION

Pin73 of IC601 connect to pin68(VDD) ► Frequency Counter : 1.048576MHz±24Hz

5. ERROR NUMBERS AND NEW TEST MODE

● Error Numbers And New Test Mode

● Indicating An Error Number

If the CD should fail to operate in CD multi player or if an error has taken place during the operation and resulted in an error, the player will enter into the error mode. And the cause of such error is numerically indicated.

This is aimed at assisting an analysis or repair.

(1) Basic Means of Display

·With ERROR indicated in "MODE" on IP-BUS Display data, an error code is transmitted by the use of MIN and SEC. Identical data are transmitted with MIN and SEC.

·Examples of Display ERROR-XX

(2) Error Codes

Error Code	Classification	Description	Cause/Detail
10	ELECTRIC	Carriage home failure	Carriage doesn't move to or from the innermost position →Home switch failed and / or carriage immobile
11	ELECTRIC	Focus failure	Focus failed →Defects, disc upside-down, severe vibration
12	ELECTRIC	SETUP failure Subcode failure	Spindle failed to lock or subcode unreadable →Spindle defective, defect, severe vibration
14	ELECTRIC	Mirror failure	Unrecorded CD-R The disc is upside-down, defects, vibration
17	ELECTRIC	Set up failure	AGC protect failed →Defects, disc upside-down, severe vibration
30	ELECTRIC	Search time out	Failed to reach target address →Carriage / tracking defective and/or defects
A0	SYSTEM	Power failure	Power overvoltage or short circuit detected →Switching transistor defective and / or power abnormal
50	MECHANISM	An error upon ejection	MAG switch release time has time out Elevation time out when eject
60	MECHANISM	An error while putting in and out the tray	Tray in / out time has time out Tray is caught when put in
70	MECHANISM	An error upon elevation	Elevation time has time out
80	MECHANISM	An error with an empty magazine inserted	No disc is available

* Setup means a series of operations after focusing up to sound output.

● New Test Mode(aging operation and setup analysis)

The single CD player plays in normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, if any, (and disc number)

During the setup, the CD software operation status (internal RAM and C-point) is displayed.

(1) How to enter NEW TEST Mode

See the test mode flow chart Page 18.

(2) Relations of keys between TEST and NEW TEST Modes

Keys	Test Mode		New Test Mode	
	Regulator OFF	Regulator ON	PLAY in progress	Error Occurred, Protection Activated
BAND	Regulator ON	Regulator OFF	—	Time of occurrence / cause of error select
FF	—	FWD-KICK	TRACK UP / FF	—
REV	—	REV-KICK	TRACK DOWN / REV	—
7	—	TRACKING CLOSE	RPT	—
8	—	TRACKING OPEN	RANDOM	—
9	—	FOCUS CLOSE	ITS	—
12	To New Test Mode	Focus Mode Select	PAUSE	—

Operations, such as EJECT, CD ON/OFF, etc. are performed normally

(3) Error Cause (Error Number) Code

Error Code	Classification	Mode	Description	Cause	Detail
40	ELECTRIC	PLAY	FOK=L 100ms	Put out of focus	Scratch, Stain, Vibration, Servo defect, etc...
41	ELECTRIC	PLAY	LOCK=L 150ms	Spindle unlock	
42	ELECTRIC	PLAY	Subcode unacceptable 500ms	Failed to read subcode	
43	ELECTRIC	PLAY	Sound skipped	Last address memory operated	

(4) Indicating an Operation Status During Setup

Status No.	Description	Protection operation
01	Carriage home mode started	None
02	Carriage moving inwards	10-second time out, home switch failed
03	Carriage moving outwards	10-second time out, home switch failed
05	Carriage moving outwards	None
11	Setup started	None
12	Spindle turn/Focus search started	None
13	Waiting for focus closure (XSI=L)	Failure to close focus
10, 14	Waiting for focus closure (FOK=H)	Failure to close focus
15, 16, 17	Focus closed, Tracking open	Focus disrupted
18	During focus AGC Subcode waiting	Focus disrupted
19	During tracking AGC	Disrupted focus
20	Waiting for MIRR, LOCK or subcode read Carriage closed, SPINDLE=ADAPTIVE	Focus disrupted, MIRR NG, failure to lock, failed to read subcode

(5) Example of Display.

·SET UP in progress

Single-CD			Multi-CD		
TNo.	Min	Sec	TNo.	Min	Sec
91	91	91	11	11	11

·Operation (PLAY, SEARCH, etc.) in progress perfectly identical with that in the normal mode.

·Protection/Error upon occurrence

(a) Error number indicated

ERROR-xx

Select the display with the
BAND key.

(b) Track number and
absolute time indicated

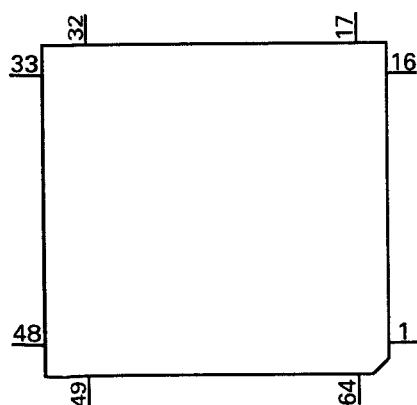
TNo. Min Sec
10 40 05

6. IC INFORMATION

● Pin Functions(PD5338A)

Pin No.	Pin Name	I/O	Format	Function and Operation
1-8	NC			Not used
9	DSPCK	O	C	DSP serial clock output
10	DSPOUT	O	C	DSP data output
11,12	NC			Not used
13	BSCK	I/O	C	Communication serial clock input/output
14	BSO	O	C	IP-BUS serial data output
15	BSI	I		IP-BUS serial data input
16	NC			Not used
17	NC			Not used
18	CNVSS	I		GND
19	RESET	I		Reset Input
20	DPD	O	C	A/D converter offset calibration output
21	BRST	O	C	Reset output
22	XIN	I		Crystal oscillating element connection pin
23	XOUT	O	C	Crystal oscillating element connection pin
24	VSS			GND
25	DSPMUTE	O	C	DSP mute output
26	DSPRST	O	C	DSP reset control
27	DSPRDY	O	C	Microcomputer I/F reception enable output
28	DSPAK	I		DSP ready/busy
29	DSPRQ	O	C	DSP serial request output
30	EMPIN	I		CD single de-emphasis input
31	EMPOUT	O	C	Emphasis control input control output
32	LRCK	O	C	LRCK select control output
33-49	NC			Not used
50	BSRQ	O	C	P-BUS service request output pin
51	BRXEN	I/O	C	P-BUS reception enable input/output pin
52	TENBL	I		Test enable input
53	TESTIN	I		Test program start input
54	DSPPW	O	C	Power supply for DSP
55	NC			Not used
56	BMUTEIN	I		Mute input when CD single is in error
57	VDD			Power supply
58	VREF	I		A/D converter reference voltage input
59	AVSS			A/D GND
60	VST	O	C	Strobe pulse output for electronic volume
61	VDI	O	C	Data output for electronic volume
62	VCK	O	C	Clock output for electronic volume
63,64	NC			Not used

*PD5338A



Format	Meaning
C	C MOS

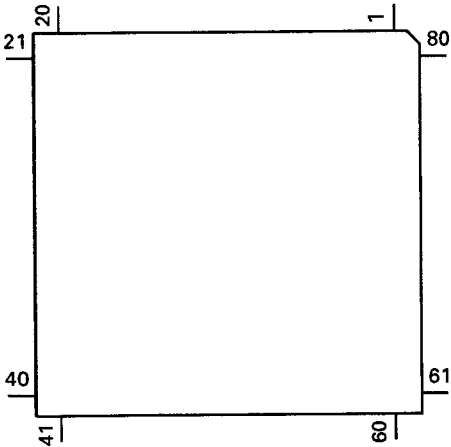
IC's marked by* are MOS type.
Be careful in handling them because they are
very liable to be damaged by electrostatic induction.

● Pin Functions(PD4653A)

Pin No.	Pin Name	I/O	Format	Function and Operation
1,2	NC			Not used
3	BMUTEIN	I		S-6 mute request input
4	AVSS			A/D GND
5	NC			Not used
6	MUTERO			GND
7	AVREF1			+5V
8	RXD	I		Serial communication data input
9	TXD	O	C	Serial communication data output
10	CE	O	C	Chip enable input
11-13	NC			Not used
14	BRST	O	C	IP-BUS reset output
15	BRXEN	I/O	C	IP-BUS reception enable input/output
16	BSRQ	I		IP-BUS communication request input
17	BSIO	I/O	C	IP-BUS serial data input/output
18	BSCK	I/O	C	IP-BUS serial clock input/output
19	CDRST	O	C	Reset for CD mechanism module
20	NC			Not used
21	PLAY	O	C	MS gain select output
22	DLBYBC	O	C	Cassette mechanism dolby NR B/C select output
23	NR	O	C	Cassette mechanism NR output
24	SC1	O	C	Cassette mechanism sub motor control output
25	SC2	O	C	Cassette mechanism sub motor control output
26	CM	O	C	Cassette mechanism capstan motor control output
27	MSIN	I		Cassette mechanism MS sense input
28	DIRO	O	C	Cassette mechanism head F/R select output
29	MTLSW	I		Cassette mechanism metal sense input
30	LOADSW	I		Cassette mechanism tape loading input
31	POS	I		Cassette mechanism position sense input
32	RES	I		Cassette mechanism reverse end sense input
33	VSS			GND
34	NES	I		Cassette mechanism normal end sense input
35	STBY	O	C	Cassette mechanism driver stand-by output
36	FLEX	O	NH	Sound tune-up IC control
37	SHELL	I		Cassette mechanism shell detection input
38	TUNANT	O	NH	Auto antenna control output
39	NC			Not used
40	TELIN	I		Telephone mute input
41	SYSPWR	O	C	System power control
42	FLPILM	O	C	Inside flap illumination control
43	NC			Not used
44	ASENBO	O	C	Slave power supply control output
45	PEE	O	C	Beep tone output
46	MUTE	O	C	System mute
47	FLPPWR	O	C	Flap power
48	NC			Not used
49	PCL	O	C	For clock adjustment
50	FM/AM	O	C	FM/AM power select output
51	MONO	O	C	Forced mono output
52	NC			Not used
53	MODEL	I		Model discriminate
54,55	SOR0,1	O	C	Source select output 0,1
56	TX	O	C	IP BUS data output
57	RX	I		IP BUS data input
58	IPPW	O	C	Power supply control output for IP BUS interface IC
59	SD	I		SD signal input
60	RESET			Reset
61	MSSENS	I		Music sense

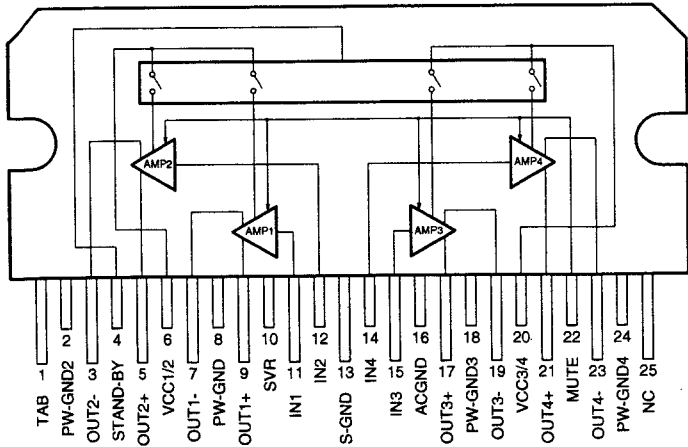
Pin No.	Pin Name	I/O	Format	Function and Operation
62	BSENS	I		Back up power sense input
63	ASENS	I		ACC power sense input
64	PDI	I		PLL data input
65	PDO	O	C	Data output for PLL IC
66	PCK	O	C	PLL clock output
67	PCE	O	C	Chip enable output for PLL IC
68	VDD			Power supply
69	XO	O	C	Crystal oscillator connection pin
70	XI	I		Crystal oscillator connection pin
71	IC			GND
72	NC			Not used
73	TESTIN	I		Test program mode input
74	AVDD	I		Positive power supply terminal for analog circuit
75	NC			Not used
76	SL	I		Signal level input
77	FLPCLS	O	C	Flap motor close output
78	FLPOPEN	O	C	Flap motor open output
79	FOPNSW	I		Auto flap open SW sense
80	FCLSSW	I		Auto flap close SW sense

*PD4653A



Format	Meaning
C	C MOS
NH	High resistivity N channel open drain

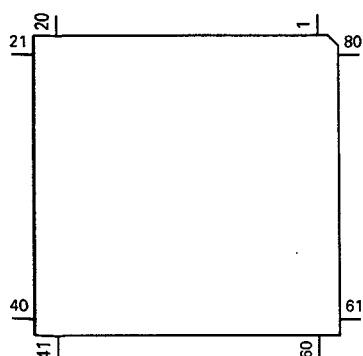
PAL003A



● Pin Functions(PD4655B)

Pin No.	Pin Name	I/O	Format	Function and Operation
1	BATT	O	C	Back up voltage detect
2	AVSW	O	C	AD power supply switch
3	NC			Not used
4	AVSS			A/D GND
5,6	NC			Not used
7	AVREF1			GND
8	DSPIN	I		DSP serial data input
9	KEYOUT	O	C	Key data output
10,11	NC			Not used
12	LDSO	O	C	LCD driver communication data output
13	LSCK	O	C	LCD driver communication clock output
14	SPCS2	O	C	Communication chip select of the spectrum analyzer IC
15	SPCWR	I/O	C	Communication read/write control of the spectrum analyzer IC
16	SPCI	I		Communication data input of the spectrum analyzer IC
17	SPCO	O	C	Communication data output of the spectrum analyzer IC
18	SPCK	I/O	C	Communication clock output of the spectrum analyzer IC
19	FUNC			Not used
20	SPRST	O	C	Reset output for spectrum analyzer IC
21	SPCS1	O	C	Communication chip select of the spectrum analyzer IC
22-32	NC			Not used
33	VSS			GND
34	EJECT	I		Eject key input
35	FLPOPCL	I		Flap open key input
36-39	CONT0-3	O		Contrast adjustment output
40,41	NC			Not used
42	LA_D	O	C	LCD driver communication address/data select
43	LLATC	O	C	LCD driver communication latch output
44	LPOW	O	C	LCD power source control
45	BKLT	O	C	Back-light control
46-59	NC			Not used
60	RESET	I		Reset input
61	REMIN	I		Remote control signal input
62	TESTIN	I		Test program mode input
63	CE	I		Chip enable input
64-67	NC			Not used
68	VDD			Power supply
69	XO	O	C	Crystal oscillator connection pin
70	XI	I		Crystal oscillator connection pin
71	IC			GND
72	NC			Not used
73	NC			GND
74	AVDD			Positive power supply terminal for analog circuit
75	AVREF0			Reference power supply
76-80	KDT0-4	I		Key input

*PD4655B



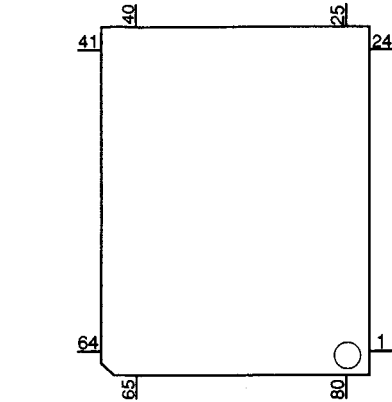
Format	Meaning
C	C MOS

● Pin Functions(LC83015JE)

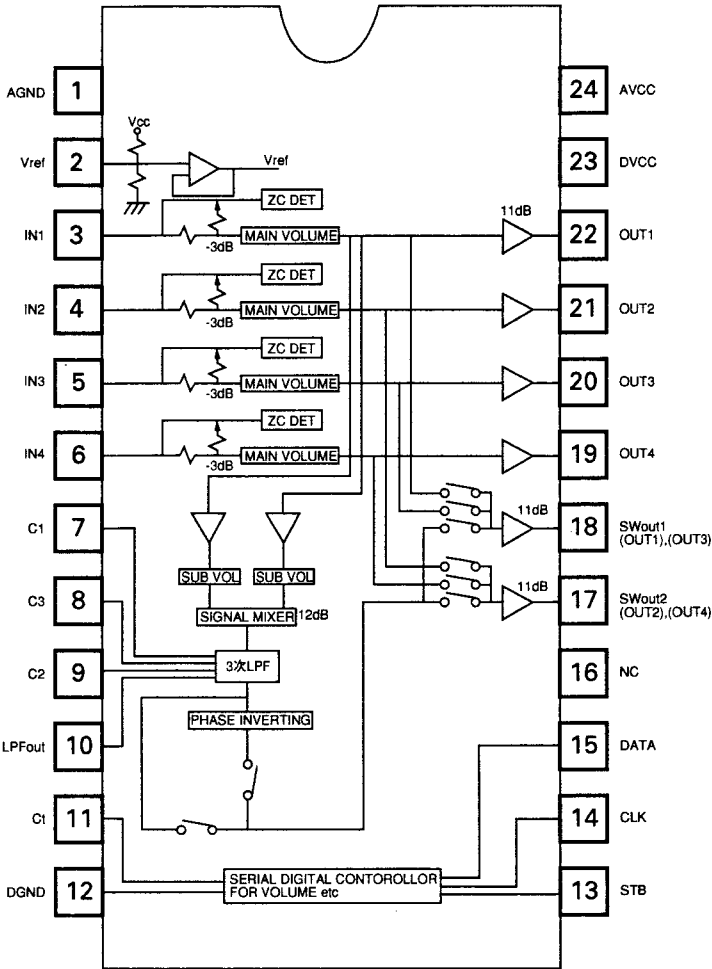
Pin No.	Pin Name	I/O	Format	Function and Operation
1-6	P0-P5	I/O	C	Input/output port
7	ASI1	I		Audio data serial input 1
8	BCK1	I		Bit clock input
9	FS384I	I		384fs or 512fs input
10	LRCKI	I		L/R channel detect signal input
11	ASI2	I		Audio data serial input 2
12	BCK2	I		Bit clock input
13	VDD1			+5V power supply
14-17	TEST1-4	I		Test terminal
18	VSS1			GND
19	TEST5	I		Test terminal
20	RAS	O	C	RAS signal output when DRAM access
21	CAS	O	C	CAS signal output when DRAM access
22	DWRT	O	C	Data write signal output when memory access
23	DREAD	O	C	Data read signal output when memory access
24	CE/CS	O	C	Chip enable signal output for SRAM
25-32	D7-D0	I/O	C	Data input/output
33	VSS2			GND
34-50	A0-A16	O	C	Address output
51	VDD2			+5V power supply
52	OSC1	I		Crystal input
53	OSC2	O	C	Crystal output
54	VSS3			GND
55	FS384O	O	C	384fs or 512fs output
56	FS192O	O	C	192fs or 256fs output
57	FS128O	O	C	128fs output
58	FS64O	O	C	64fs or 32fs output
59	FS32O	O	C	32fs or 16fs output
60	LRCKO	O	C	1fs output
61	AOWCK	O	C	2fs or 1fs output
62	ASO	O	C	Audio data serial output 1
63	AOTDF1	O	C	Audio data serial output 2
64	AOTDF2	O	C	Audio data serial output 3
65	SI	I		Serial data input
66	SICK	I		Serial clock input for SI
67	SIRQ	I		Request signal input
68	SIACK	O	C	Output terminal which indicates serial input now being conducted
69	SRDY	I		Ready signal input
70	SO	O	C	Serial data output
71	SOCK	I		Serial clock input for SO
72	SORQ	I		Request signal input
73	SOACK	O	C	Output terminal which indicates serial output now being conducted
74	VSS4			GND
75	RES	I		Reset
76	INT	I		Interrupt request input
77	VDD3			+5V power supply
78	SELC	I		System clock switch
79	SACK1	I		Frequency divider output switch
80	SACK2	I		FS output clock switch

Format	Meaning
C	C MOS

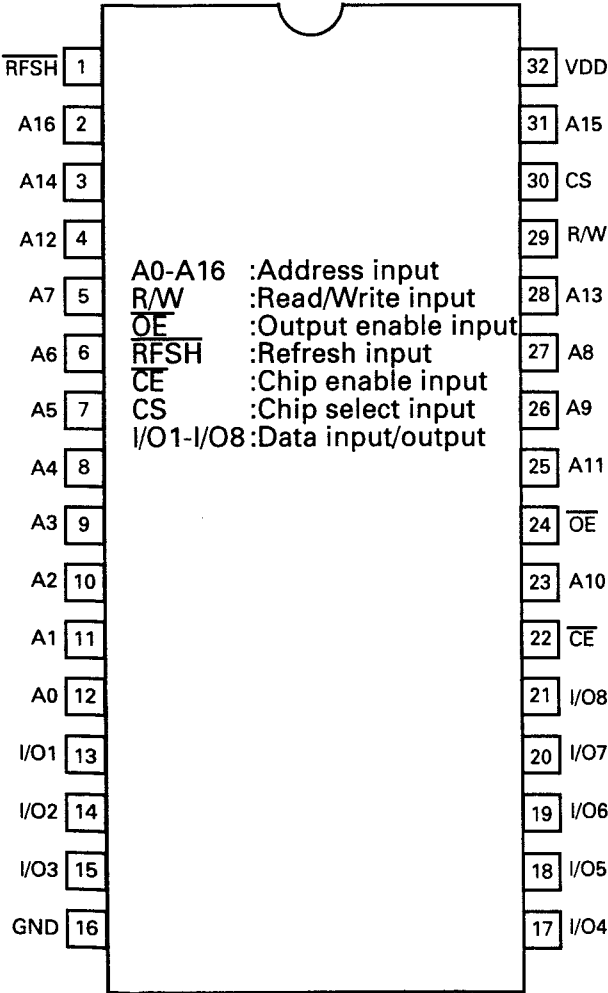
*LC83015JE



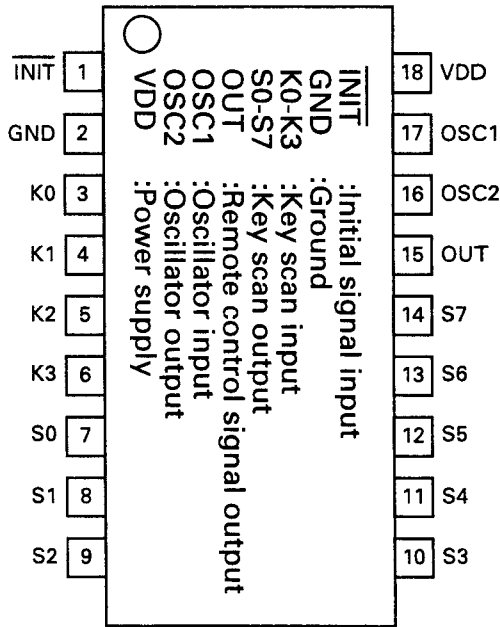
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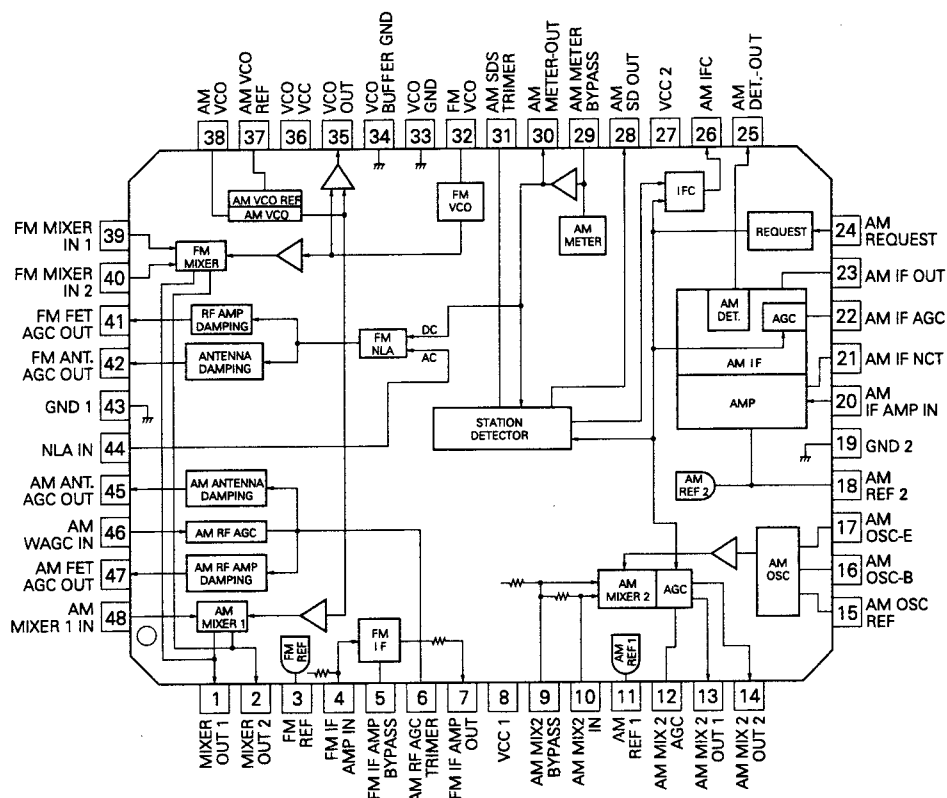
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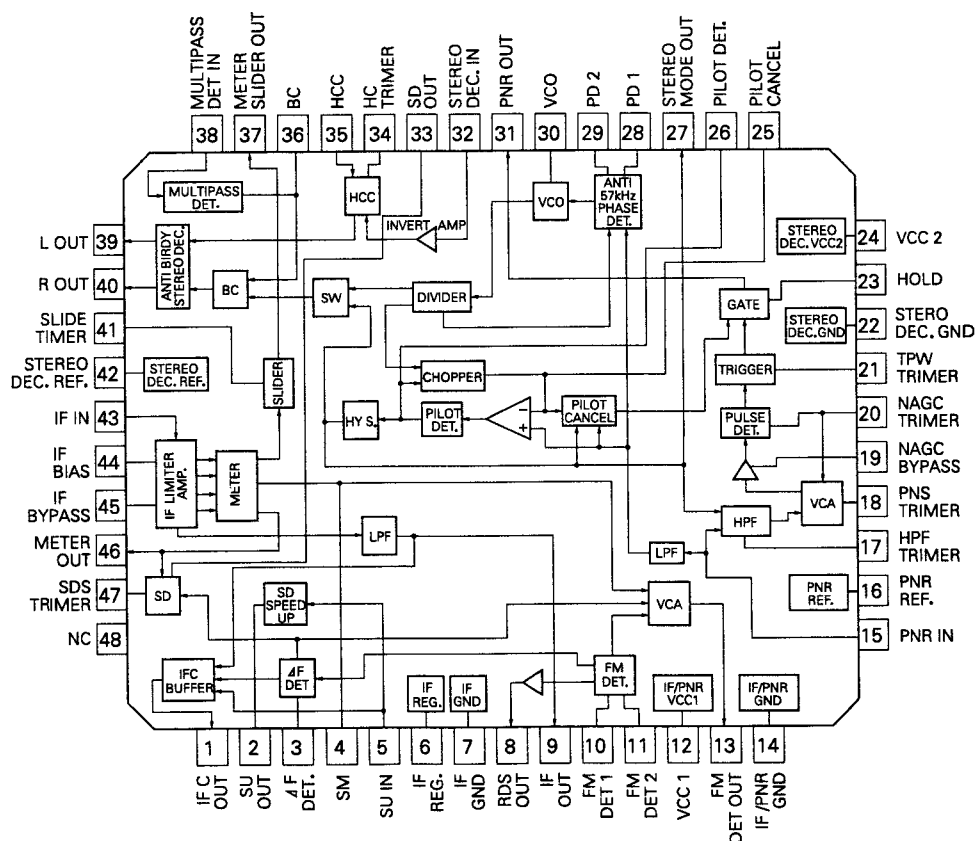
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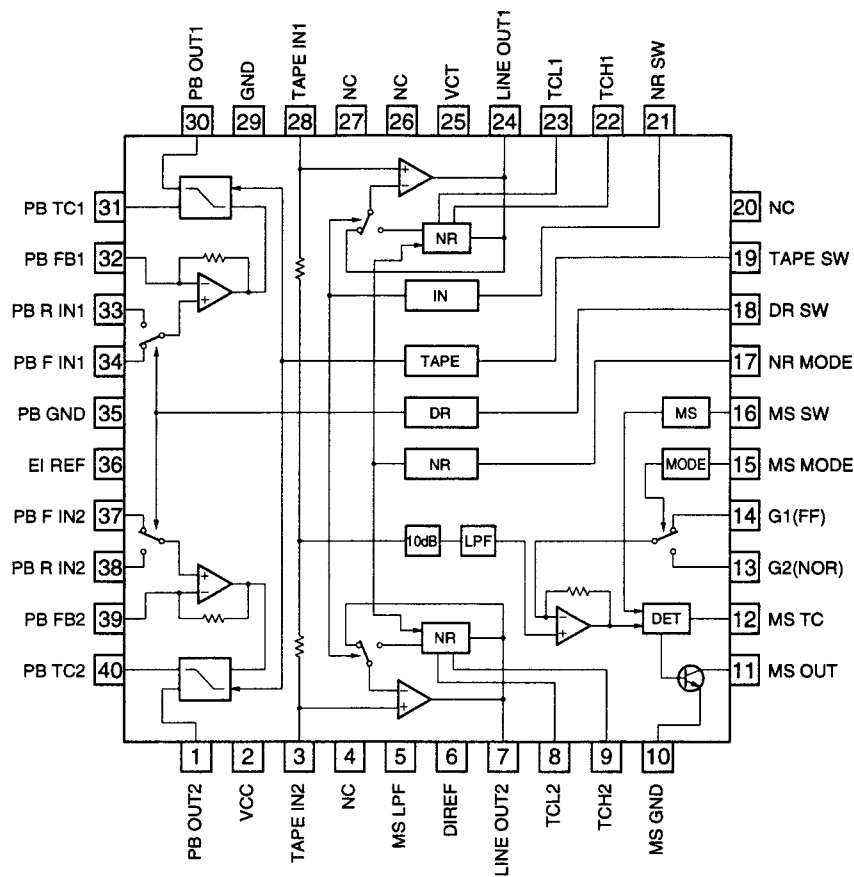
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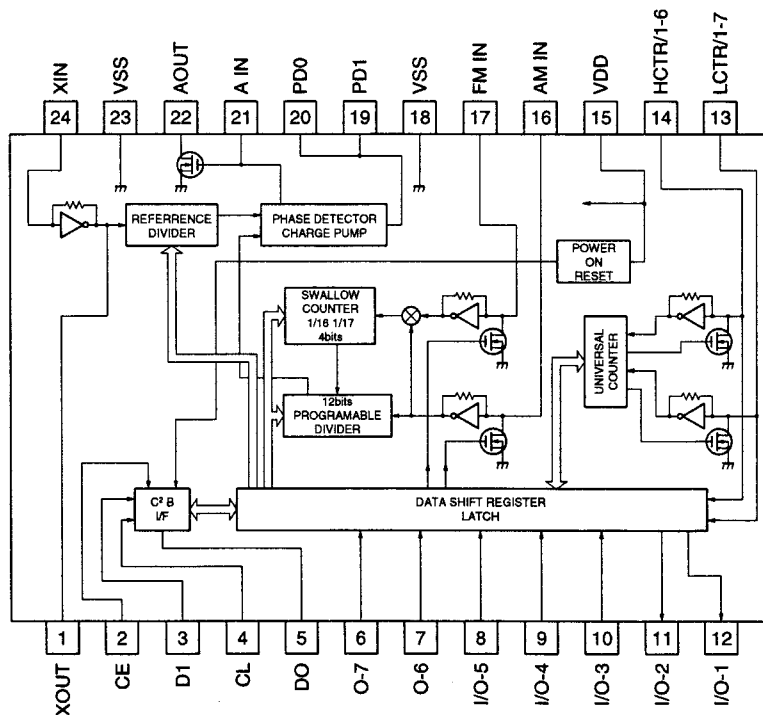
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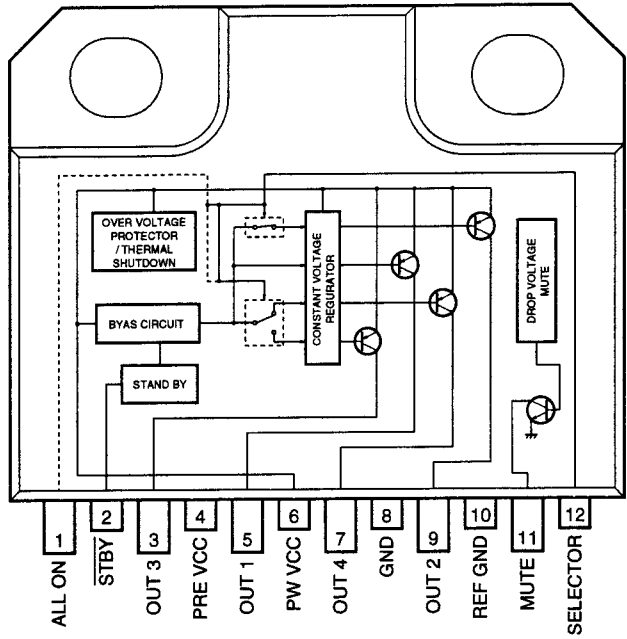
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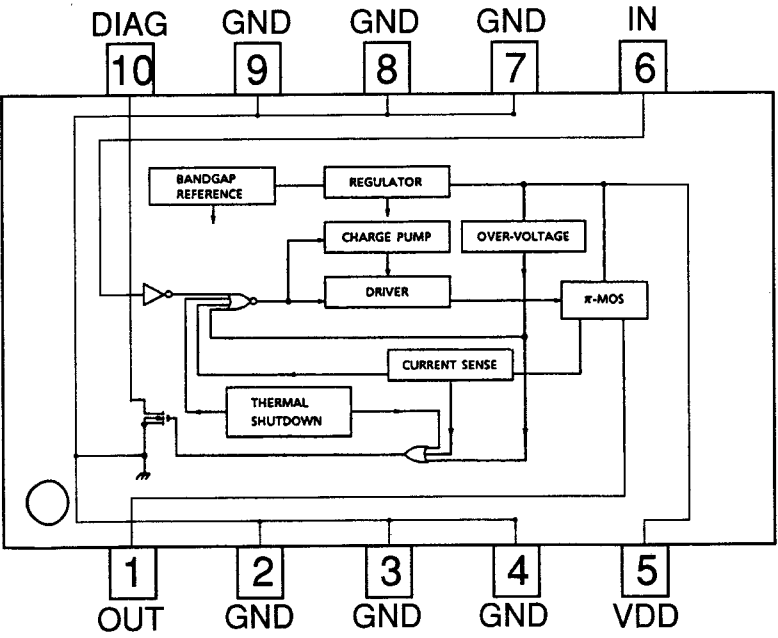
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PA2024A



TPD1018F

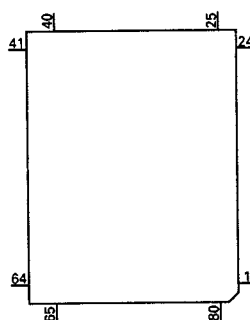


● Pin Functions(UPD63700GF1)

Pin No.	Pin Name	I/O	Function and Operation
1	D.GND		Logic circuit GND
2	RFOK	O	RFOK detection signal output terminal
3	MIRR	O	MIRR detection signal output terminal
4	TBC	I	Tracking filter bank switching terminal
5	HOLD	I	Hold control signal input terminal
6	D.VDD		VDD for logic circuit
7	RST	I	System reset
8	AO	I	Control signal distinguishing data from microcomputer
9	STB	I	Signal latching serial data inside LSI
10	SCK	I	Clock input terminal for serial data input and output
11	SO	O	Serial data and status signal output
12	SI	I	Serial data input
13	TM2	I	Double speed playback control terminal
14	D.GND		Logic circuit GND
15	TEST	I	Test terminal
16	STBY	I	Stand-by input terminal
17	CTLV	I	Control terminal for clock generation VCO used by digital PLL in double speed playback mode
18	POUT	O	Output terminal for phase comparison between EFM signal and bit clock
19	D.GND		Logic circuit GND
20	VCO	I	Inverter input
21	VCO	O	Inverter output
22	D.VDD		VDD for logic circuit
23	PLCK	O	Bit clock monitor terminal
24	LOCK	O	"H" when synchronization signal and frame counter output coincide at EFM demodulator
25	WFCK	O	Signal issuing one-frame period by bit clock dividing signal
26	RFCK	O	Oscillation clock divider signal, output pin for signal giving 1-frame sync
27	C4M	O	Output terminal for signal having four the frequency of LRCK
28	C16M	O	Oscillation clock output terminal
29	D.GND		Logic circuit GND
30	XTAL	I	Oscillation continuation terminal
31	XTAL	O	Oscillation continuation terminal
32	D.VDD		VDD for logic circuit
33	SCKO	O	Clock output terminal for audio serial data
34	LRCK	O	Signal distinguishing between left and right channel DOUT terminal output
35	DOUT	O	Serial audio data output terminal
36	TX	O	Digital audio interface data output terminal
37	FLAG	O	Flag signal indicating that the current audio data output of incorrectable data
38	EMPH	I/O	Emphasis information input/output
39	WDCK	O	Output terminal for signal having double the frequency of LRCK
40	C2D3	O	Output terminal indicating C2 error correction status
41	SFSY	O	Signal indicating subcode one-frame synchronization
42	SBSY	O	Signal indicating head of subcode block
43	SBSO	O	Subcode data output terminal
44	SBCK	I	Subcode data read clock input terminal
45	D.GND		Logic circuit GND
46,47	C1D1,C1D2	O	Output terminal indicating C1 error correction status
48,49	C2D1,C2D2	O	Output terminal indicating C2 error correction status
50	T4	I	Selects between focus and tracking modulation mode
51	T5	I	Selects motor modulation mode
52	T6	I	Sets focus PWM output mode
53	T7	I	Sets tracking PWM output mode
54	D.VDD		VDD for logic circuit
55	MRD	O	PWM negative output terminal for the spindle loop filter

Pin No.	Pin Name	I/O	Function and Operation
56	MFD	O	PWM positive output terminal for the spindle loop filter
57	SRD	O	PWM negative output terminal for the thread loop filter
58	SFD	O	PWM positive output terminal for the thread loop filter
59	D.GND		Logic circuit GND
60	TRD	O	PWM negative output terminal for the tracking loop filter
61	TFD	O	PWM positive output terminal for the tracking loop filter
62	FRD	O	PWM negative output terminal for the focus loop filter
63	FFD	O	PWM positive output terminal for the focus loop filter
64	D.VDD		VDD for logic circuit
65	OUTSEL	I	Sets PWM output mode for the motor system
66	TEC1	I	Tracking error input terminal
67	TEC0	I	Tracking error input terminal
68	A.VDD		VDD for analog circuit
69,70	VR2,VR1	I	A/D converter input
71	TE	I	Tracking error input terminal
72	FE	I	Focus error input terminal
73	RFB	I	RFB signal input terminal
74	RFP	I	RFP signal input terminal
75	A.GND		Analog circuit GND
76	REFOUT	O	A/D converter midpoint voltage output terminal inside LSI
77	RFI	I	RF signal input terminal for EFM comparator
78	ASI	I	Level comparing input for RF signal comparison
79	EFM	O	EFM signal output terminal
80	A.VDD		VDD for analog circuit

*UPD63700GF1

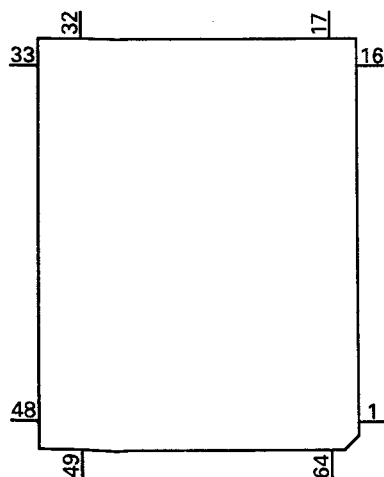


● Pin Functions(PD4690A)

Pin No.	Pin Name	I/O	Format	Function and Operation
1	NC			Not used
2	XRST	O	C	CD LSI reset output
3-5	CBNK2-0	O	C	DSP bank for compressor set up output
6	DRST	O	C	DSP bank for compressor reset output
7	HOME	I		Home position detector input
8	CLAMP	I		Disc clamp sense input
9	VSS			GND
10	LATCH	O	C	Latch output
11	EJECT	O	C	Loading motor EJECT control
12	LOAD	O	C	Loading motor LOAD control
13	CONT	O	C	Servo driver power supply control
14	NC			Not used
15	CDMUTE	O	C	CD mute output
16	NC			Not used
17	ADENA	O	C	A/D reference voltage output

Pin No.	Pin Name	I/O	Format	Function and Operation
18-23	NC			Not used
24	VSS			GND
25	NC			Not used
26	DSET	O	C	Disc set indicator light output
27-30	NC			Not used
31	BRXEN	I/O	C	Reception enable input/output
32	BSRQ	O	C	IP-BUS serial pole request output
33	VDCONT	O	C	VD control output
34	CD5VON	O	C	CD +5V power supply control output
35	RESET	I		Reset input
36	TXARI	I		Set up of TX output select input
37	EJSW	I		Eject key input(Not used)
38	BRST	I		Reset input
39	COMP	I		Compression select input
40	VDD			Power supply
41	X2	O	C	Crystal oscillator connection pin
42	X1	I		Crystal oscillator connection pin
43	VSS			GND
44	NC			Not used
45	TESTIN	I		Test program start input
46	VSS			A/D GND
47	TEMP	I		Temperature detector
48	VDSENS	I		Over voltage sense input
49	EJTD	I		Disc eject position sense input
50	DINC	I		Disc insert sense input
51	NC			Not used
52	FOK	I		FOK signal input
53	MIRR	I		Mirror detector input
54	LOCK	I		Spindle lock detector input
55	AVDD			A/D analog power supply
56	AVREF	I		A/D converter reference voltage
57	XSI	I		LSI data input
58	XSO	O	NM	LSI data output
59	XSCK	O	NM	LSI clock output
60	XSTB	O	C	CD LSI strobe output
61	XA0	O	C	Control signal distinguishing data from microcomputer
62	VSS			GND
63	BDATA	I/O	C	IP-BUS serial data input/output
64	BSCK	I/O	C	IP-BUS serial clock input/output

*PD4690A



Format	Meaning
C	C MOS
NM	Middle resistivity N channel open drain

7. ELECTRICAL PARTS LIST

NOTES:

● Parts whose parts numbers are omitted are subject to being not supplied.

● The part numbers shown below indicate chip components.

Chip Resistor

RS1/OSOOOJ,RS1/OOSOOOJ

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

====Circuit Symbol & No. Part Name=====	Part No.	====Circuit Symbol & No. Part Name=====	Part No.
Unit Number : CWE1365		R 9	RS1/16S153J
Unit Name : FM/AM Tuner Unit		R 10	RS1/16S682J
		R 11	RS1/16S474J
		R 13	RS1/16S104J
		R 15 103 217	RS1/16S563J
MISCELLANEOUS			
IC 1	PA2025A		
IC 2	PA2026A	R 17 21 206	RS1/16S332J
Q 1 FET	3SK263	R 18	RS1/16S223J
Q 2	2SC2712	R 19	RS1/16S821J
Q 3	DTC124EU	R 22	RS1/16S560J
		R 32	RS1/16S682J
Q 51	DTC124TU		
Q 52	2SC4098	R 51	RS1/16S391J
Q 190	2SA1586	R 52	RS1/16S182J
Q 191 202	2SC2712	R 53	RS1/16S751J
Q 201	2SK932	R 54	RS1/16S223J
		R 55 102 209 222	RS1/16S822J
D 1	1SV251		
D 2 3 4	KV1410-F1	R 56	RS1/16S272J
D 5	MA151WK	R 71	RS1/16S182J
D 6 7	RD39JS	R 72	RS1/16S821J
D 8 201	MA157	R 73	RS1/16S331J
		R 74	RS1/16S681J
D 191	MA157		
D 202	MA110	R 101	RS1/16S224J
D 203	SVC253	R 104	RS1/16S822J
L 1 Inductor	LCTBR12K2125	R 153 159 161	RS1/16S103J
L 2 4 Coil	CTC1126	R 154	RS1/16S123J
		R 155	RS1/16S822J
L 3 Coil	CTC1124		
L 5 Coil	CTC1125	R 156	RS1/16S822J
L 51 Ferri-Inductor	LAU2R2K	R 157	RS1/16S562J
L 52 Ferri-Inductor	LAU150K	R 158	RS1/16S682J
L 201 Ferri-Inductor	LAU4R7K	R 160 190	RS1/16S473J
		R 191 207 299	RS1/16S225J
L 203 Ferri-Inductor 1mH	CTF1026		
L 204 Ferri-Inductor	LAU151K	R 192	RS1/16S221J
L 206 Inductor	LAU3R3J	R 193	RS1/16S224J
L 207 Ferri-Inductor	LAU330K	R 194 298	RS1/16S225J
T 2 Coil	CTE1077	R 203	RS1/16S102J
		R 204 213	RS1/16S222J
T 51 Coil	CTC1119		
T 204 Coil	CTE1074	R 205	RS1/16S333J
T 205 Coil	CTE1075	R 208	RS1/16S752J
CF 51 52 201 Ceramic Filter	CTF1290	R 214 218	RS1/16S333J
CF 202 Ceramic Filter	CTF1300	R 215 224	RS1/16S330J
		R 216	RS1/16S152J
X 151 Ceramic Resonator 456kHz	CSS1308		
X 201 Crystal Resonator 10.26MHz	CSS1111	R 220	RS1/16S100J
VR 51 Semi-fixed 22kΩ (B)	CCP1208	R 221	RS1/16S273J
VR 52 Semi-fixed 68kΩ (B)	CCP1211	R 239	RS1/16S103J
VR 151 Semi-fixed 10kΩ (B)	CCP1206		
RESISTORS		CAPACITORS	
R 1 3 16 20	RS1/16S223J	C 1	CCS1CH220J50
R 2	RS1/16S331J	C 2 11 19 29 51 52 62 63 164 209	CKSYB103K50
R 4 14	RS1/16S563J	C 3	CCS1CH470J50
R 6	RS1/16S123J	C 4	CCS1FH270J50
R 8	RS1/16S271J	C 5	CCS1FH080D50
		C 6	CCS1FH040C50
		C 8	CKSYB102K50
		C 9	CCS1CH470J50
		C 10	CCS1FH100D50
		C 12 13	CCS1CH050D50

====Circuit Symbol & No. Part Name=====							Part No.	====Circuit Symbol & No. Part Name=====							Part No.
C 14	20	21	227	228			CKSRB103K50	IC 1703 1704					TA2063F		
C 15	55	58	101	161			CKSQB104K16	IC 1801 1802					TPD1018F		
C 16							CCSRCH20C50	Q 1501 1510 1604 1804 1810					DTC124ES		
C 17							CCSRRH100D50	Q 1502					DTA124ES		
C 18							CCSRRH090D50	Q 1503 1504					DTC314TK		
C 23	56	104	162				CEA010M50LL	Q 1505 1506 1507 1508					DTC314TK		
C 24	106	213	236				CKSRB223K25	Q 1509					DTA114ES		
C 26	28	212					CEA330M10LL	Q 1511 1512 1513 1514 1515 1516					DTC314TK		
C 27							CKSRB103K50	Q 1601					DTC124EK		
C 31	73						CKSRB333K16	Q 1602					DTA114EK		
C 32							CKSRB222K50	Q 1603					2SD2396		
C 34							CKSRB682K50	Q 1801 1813					2SD1760F5		
C 53	54						CCSRCH270J50	Q 1802					DTC114TS		
C 57	64	66					CCSRCH101J50	Q 1803 1805 1808 1809 1814					2SC2458		
C 59							CEAR47M50LL	Q 1806					2SA1797		
C 61							CEAR22M50LL	Q 1807 1811					2SA1048		
C 72							CKSRB102K50	Q 1812					2SD1684		
C 102	154	156	163	203	219	238	CKSQB473K16	D 1501 1502 1503 1601 1602 1603 1604 1607 1608 1609					1SS133		
C 103							CKSRB222K50	D 1605					HZS9LC1		
C 105	206						CKSRB222K50	D 1606 1801 1802 1809 1815 1816 1817					ERA15-02VH		
C 152	153						CKSRB333K16	D 1804 1808 1810 1811					1SS133		
C 155							CEAR68M50LL	D 1805					1SS133		
C 158							CEA100M16LL	D 1806					HZS6LC3		
C 159							CCSRCH271J50	D 1807					HZS7LC2		
C 160							CKSYB105K16	D 1812					HZS4LLB		
C 190							CKSRB223K25	D 1813					MA3068M		
C 191							CEA150M10LS	D 1814					MA3091M		
C 201							CCSRCH471J50	D 1818					HZS16L1		
C 204							CCSRCH151J50	L 1401 1402 1601 1603	Ferri-Inductor				LAU2R2K		
C 205	221						CCSRCH680J50	L 1602 1609 1611 1701	Ferri-Inductor				LAU2R7K		
C 207							CEA101M16LL	L 1604 1605 1606 1612	Ferri-Inductor				LAU2R2K		
C 208							CKSRB102K50	L 1613 1802	Ferri-Inductor				LAU2R2K		
C 210	215	220	223	225	235		CKSRB103K50	L 1614 1615	Ferri-Inductor				LAU2R7K		
C 211							CKSYB105K16	L 1617	Inductor				CTF1305		
C 214	230						CKSRB472K50	L 1702 1703 1704	Ferri-Inductor				LAU2R7K		
C 216							CCSRCH100D50	L 1706	Ferri-Inductor				LAU2R7K		
C 217							CCSRCH221J50	L 1708 1709 1710	Ferri-Inductor				LAU2R7K		
C 218							CEA4R7M35LL	L 1801	Choke Coil 600H				CTH1170		
C 222							CCSRCH150J50	X 1601	Crystal Resonator 8.000MHz				CSS1107		
C 224							CCSRUJ181J50	X 1701	Crystal Resonator 16.9344MHz				CSS1067		
C 226							CEA4R7M35LL	FU14011701	IC Protector 0.6A				ICP-N15		
C 229							CEAR68M50LL	EF1601					CCG1070		
C 232							CCSRTH220J50								
C 233							CKSRB332K50								
C 234							CEA220M6R3LL								
C 239							CKSRB332K50								
C 240							CKSRB103K50								
Unit Number : CWM4451															
Unit Name : DSP Amp Unit															
MISCELLANEOUS															
IC 1401							NJM4558MD								
IC 1402							AK5340-VS								
IC 1501							PAL003A								
IC 1502							PM0009AM								
IC 1601							LC83015JE								
IC 1602							TC518129CFWI								
IC 1603							PD5338A								
IC 1604							TC74HC393AF								
IC 1605							TC74HC175AF								
IC 1606							TC74HC158AF								
IC 1607							S-80722AN-DK								
IC 1608							L780S05								
IC 1609 1610							YSF224BM								
IC 1611							TC7S08F								
IC 1701 1702							TC9268F								
								R 1401 1403 1407 1508 1812 1826					RS1/16S223J		
								R 1402 1404 1405 1406 1408 1515 1516 1816					RS1/16S223J		
								R 1409 1417 1418					RS1/16S470J		
								R 1410					RS1/16S470J		
								R 1413 1414 1416 1422 1423 1528 1608 1626					RS1/16S102J		
								R 1415 1602 1604 1616 1617 1618 1619 1620 1621 1622					RS1/16S102J		
								R 1419					RS1/16S510J		
								R 1420 1421					RS1/16S472J		
								R 1501 1504 1823 1825 1836					RS1/16S103J		
								R 1502					RS1/16S330J		
								R 1503 1662 1803					RS1/16S103J		
								R 1505					RS1/16S391J		
								R 1506					RS1/16S391J		
								R 1507					RS1/16S223J		
								R 1509 1510					RS1/16S391J		
								R 1511 1512					RS1/16S223J		
								R 1513 1514					RS1/16S391J		
								R 1517 1518 1521 1522					RD1/4PU102J		
								R 1529 1649 1807 1808 1815					RS1/16S473J		
								R 1531 1532					RS1/16S391J		

====Circuit Symbol & No. Part Name=====	Part No.	====Circuit Symbol & No. Part Name=====	Part No.
R 1533 1534 1535 1536	RS1/16S391J	C 1638 1812	CEA101M10LL
R 1601 1606 1611 1612	RA4C102J	C 1641 1642	CKSRYB103K50
R 1609 1610	RA3C102J	C 1643	CCSRCH220J50
R 1613 1614 1615 1627 1636 1637 1638 1644 1802	RS1/16S473J	C 1644 1645	CEA010M50LL
R 1623	RS1/16S102J	C 1703	CCSRCH090D50
R 1625 1629 1634 1643 1648 1650 1651 1652 1701 1814	RS1/16S102J	C 1704	CCSRCH090D50
R 1628 1630 1632 1639 1640 1642	RS1/16S221J	C 1708 1709 1717 1718 1721 1722	CKSRYB103K50
R 1631 1633 1645 1646	RS1/16S221J	C 1710 1713 1716 1719 1724 1725	CEA220M6R3LL
R 1635 1653 1654 1655 1656 1657 1663 1664 1821	RS1/16S102J	C 1723 1803 1805 1808	CKSRYB103K50
R 1647	RS1/16S124J	C 1802	CCH1180
R 1660	RD1/4PU471J	C 1804	CEA470M6R3LL
R 1661	RD1/4PU221J	C 1810	CKSQYB104K16
R 1665 1666	RD1/4PU102J	C 1814	CKSQYB104K16
R 1702	RS1/16S105J	C 1816	CCSRCH101J50
R 1805	RS1/16S101J	C 1817	CKSQYB103K25
R 1806	RS1/16S222J	Unit Number : CWM4465	
R 1809 1810	RS1/16S222J	Unit Name : Deck Tuner Unit	
R 1813	RD1/4PU222J		
R 1817	RS1/16S102J	MISCELLANEOUS	
R 1818	RS1/16S183J	IC 251	PA0059AM
R 1819 1820	RS1/16S472J	IC 252	AN6263N
R 1827	RD1/4PU471J	IC 454	XRA3131FS
R 1828 1829 1833 1834 1841 1842	RD1/4PU680J	IC 501	LC72146M
R 1830	RS1/16S222J	IC 601	PD4653A
R 1831	RS1/16S101J	IC 602	S-80734ANDYI
R 1832	RS1/10S182J	IC 603	PD4655B
R 1835	RS1/16S683J	IC 604	NJM2068MD
R 1840	RS1/16S333J	IC 605	XRA8288FS
		IC 701	PA2024A
CAPACITORS		IC 751	TA2050S
C 1401 1402	CEA2R2M35NPLL	IC 752	PA0051AM
C 1403 1404	CEA2R2M50LL	Q 250 507 704	2SC7 12
C 1405	CCSRCH820J50	Q 251 605 706	2SA1162
C 1406	CCSRCH820J50	Q 501 509 510	2SC7 12
C 1407 1408 1409 1508 1511 1512 1513 1514 1515 1516	CEA100M16LL	Q 502	2SK208
C 1410	CEWAR221M6R3	Q 506	2SC295
C 1412	CEWAR100M16	Q 514	2SC7 12
C 1413 1807	CKSQYB473K16	Q 601 603 606 707 753	DTC24EK
C 1414 1418 1517 1518 1519 1520 1606	CEA4R7M35LL	Q 602 611 713 751	DTA114EK
C 1415 1416 1417 1420 1618 1628	CKSRYB103K50	Q 604	2SD1760F5
C 1419 1509 1525 1531 1706 1720	CKSQYB104K16	Q 607 608 609 610	DTA144EK
C 1421	CKSRYB221K50	Q 752	2SA1162
C 1422	CEWAR221M6R3	D 251 601 602 603 605	1SS33
C 1423	CEWAR010M50	D 252	MA53
C 1501 1502 1503 1504	CEAR22M50LL	D 501	RD30ESB2
C 1505	CEA330M10LL	D 502 710	MA51WK
C 1506 1617 1813	CEA010M50LL	D 604	MA356H
C 1507	CEWAR010M50	D 704	MA382L
C 1510	CCH1188	D 707	MA351M
C 1521 1613 1635 1801 1809 1811	CEA100M16LL	L 501 751	LAU1R0M
C 1522 1637 1806	CKSQYB473K16	L 503	LAU12K
C 1523	CKSRYB562K50	L 601 602 603 605	LAU1R7K
C 1524	CKSQYB104K16	L 604	LAU1R7K
C 1526	CEA470M10LL	L 701	LCT1R0J3225
C 1527 1528 1529 1530	CKSQYB561K50	TH 601	CCX1025
C 1532 1533	CKSYB105K16	X 501	CSS1334
C 1534 1535 1536 1537	CKSRYB102K50	X 601	CSS1303
C 1604 1605 1614 1615 1619 1636 1701 1702 1707	CKSRYB103K50	X 602	CSS1071
C 1608 1639 1640	CCSRCH220J50		CW1399
C 1611 1612	CCSRCH220J50	EF 701 702 703	CCX1070
C 1616	CCL1035	BZ 601	CPV1011
C 1622 1623	CKSRYB103K50		
C 1624 1625	CKSRYB103K50	RESISTORS	
C 1629 1630 1631 1632	CKSRYB103K50	R 251 263	RS116S563J
C 1634	CCH1183	R 252 551 709 720	RS116S223J
		R 253 255	RS116S512J
		R 254 498 499 501 505 506 537 538 539 540	RS116S102J
		R 256	RS116S684J

====Circuit Symbol & No. Part Name=====	Part No.	====Circuit Symbol & No. Part Name=====	Part No.
R 257 258 259 260	RS1/16S183J	C 260	CEA470M6R3LL
R 261 487 488 489 490 493 494 526 527 528	RS1/16S473J	C 263	CEA010M50NPLL
R 265 266	RS1/10S152J	C 264 270 278 475 755 756	CEA100M16LL
R 267 268	RS1/16S222J	C 265 271 272 515 602 613 759	CEA4R7M35LL
R 477 478 635 636 637 638 639 760 761	RS1/16S101J	C 266	CCSRCH330J50
R 479 480 481 482 483 484	RS1/16S104J	C 268	CKSQYB223K25
R 485 486 491 492 495 496 502 514	RS1/16S103J	C 273 516 760 763	CKSQYB104K16
R 503 525 546 606 721	RS1/16S472J	C 274 275	CKSRYB222K50
R 504	RS1/16S152J	C 276 751 752 753 754	CEA010M50LL
R 507 718 766	RS1/16S472J	C 469 470 603	CCSRCH330J50
R 516 764	RS1/16S222J	C 471 472 473 474	CCSRCH151J50
R 517	RS1/16S221J	C 502	CCG1008
R 518 717 753 754 765	RS1/16S223J	C 503	CCH1165
R 519 677	RS1/16S103J	C 504	CKSQYB103K25
R 520 521	RS1/16S222J	C 508	CCSRCH101J50
R 523 524 534	RS1/16S0R0J	C 510	CKSRYB103K25
R 529 535 536 543 601 610 613 624 625 658	RS1/16S473J	C 511 512 513 514	CKSQYB223K25
R 530 619	RA4C222J	C 517 518	CCSRCH150J50
R 531	RS1/16S103J	C 519 520 611	CEA2R2M50LL
R 532	RS1/16S102J	C 527	CKSRYB103K25
R 542	RS1/16S683J	C 528 530 625	CKSQYB473K16
R 549 550	RS1/16S272J	C 529 702 704	CEA470M10LL
R 605	RS1/16S473J	C 601 605 612 621 622	CKSQYB103K25
R 608 664	RA4C221J	C 604	CCSRCH240J50
R 609 656 663 669 701 702 719 755 756 762	RS1/16S102J	C 606 607 608 609 610	CCSRCH270J50
R 612 668	RS1/16S221J	C 614 615	CCSRCH220J50
R 614	RA4C682J	C 616	CEA220M10LL
R 615 616	RA3C473J	C 619 623	CKSRYB102K50
R 618 621	RA3C222J	C 624	CKSQYB103K25
R 622 623 629 640 641 657 659 661 678 683	RS1/16S102J	C 626 627	CCSRCH101J50
R 628	RA4C681J	C 629	CCSQCH101J50
R 632	RS1/16S203J	C 630 764	CKSQYB103K25
R 633	RS1/16S393J	C 631	CKSQYB103K25
R 634	RS1/16S823J	C 632	CKSYF105Z16
R 649	RS1/16S243J	C 701	CEAS331M10
R 650	RS1/16S752J	C 708	CCSRCH101J50
R 652	RS1/16S123J	C 709	CKSRYB103K25
R 653	RS1/16S183J	C 710 711	CCSRCH101J50
R 655	RS1/16S124J	C 712	CKSRYB103K25
R 660 676 680 681 688 694 695 706 710 767	RS1/16S473J	C 716	CCSRCH101J50
R 670	RA4C102J	C 805	0.22F/5.5V
R 679	RS1/16S682J		CCL1035
R 682	RD1/4PU681J		
R 684 687 689 692 697 698 699 700	RS1/16S102J		
R 693	RS1/16S474J		
R 722	RS1/16S182J		
R 723	RS1/16S243J		
R 724	RS1/16S563J		
R 729 730 731 733 734 735 736 737 739	RD1/4PU391J		
R 732	RD1/4PU391J		
R 738	RD1/4PU621J		
R 740	RS1/16S473J		
R 751 752	RS1/16S181J		
R 759	RS1/16S620J		
R 763	RS1/16S102J		
R 768	RS1/16S473J		
R 901	RS1/16S123J		
R 902	RS1/16S560J		
CAPACITORS			
C 104	CKSRYB103K25		
C 251 252 257 258 262	CEA4R7M16NPLL		
C 253 254 617 714	CKSRYB103K25		
C 255 256 757 758	CEA100M10NPLL		
C 259 267 269 277 476 477 703	CEA101M10LL		
C 260	CEA470M6R3LL		
C 263	CEA010M50NPLL		
C 264 270 278 475 755 756	CEA100M16LL		
C 265 271 272 515 602 613 759	CEA4R7M35LL		
C 266	CCSRCH330J50		
C 268	CKSQYB223K25		
C 273 516 760 763	CKSQYB104K16		
C 274 275	CKSRYB222K50		
C 276 751 752 753 754	CEA010M50LL		
C 469 470 603	CCSRCH330J50		
C 471 472 473 474	CCSRCH151J50		
C 502	CCG1008		
C 503	CCH1165		
C 504	CKSQYB103K25		
C 508	CCSRCH101J50		
C 510	CKSRYB103K25		
C 511 512 513 514	CKSQYB223K25		
C 517 518	CCSRCH150J50		
C 519 520 611	CEA2R2M50LL		
C 527	CKSRYB103K25		
C 528 530 625	CKSQYB473K16		
C 529 702 704	CEA470M10LL		
C 601 605 612 621 622	CKSQYB103K25		
C 604	CCSRCH240J50		
C 606 607 608 609 610	CCSRCH270J50		
C 614 615	CCSRCH220J50		
C 616	CEA220M10LL		
C 619 623	CKSRYB102K50		
C 624	CKSQYB103K25		
C 626 627	CCSRCH101J50		
C 629	CCSQCH101J50		
C 630 764	CKSQYB103K25		
C 631	CKSQYB103K25		
C 632	CKSYF105Z16		
C 701	CEAS331M10		
C 708	CCSRCH101J50		
C 709	CKSRYB103K25		
C 710 711	CCSRCH101J50		
C 712	CKSRYB103K25		
C 716	CCSRCH101J50		
C 805	0.22F/5.5V		
Unit Number : CWM4454			
Unit Name : Key Board Unit			
MISCELLANEOUS			
IC 901 902	(MSC5301B-02GS-V1K)		GGC1055
IC 903			RS-30
D 901 904 905 906	Chip LED		CL170FGCD
D 907 908 909 910	Chip LED		CL170FGCD
D 911 912 913 914	Chip LED		CL170FGCD
D 915 916 917 918	Chip LED		CL170FGCD
D 919 920 921 922	Chip LED		CL170FGCD
D 923 924 925 926	Chip LED		CL170FGCD
D 927 928 929 930	Chip LED		CL170FGCD
D 931 932 933	Chip LED		CL170FGCD
L 901	Inductor		LCYA150K3225
S 901 902 903 904	Switch		CSG1075
S 905 906 907 908	Switch		CSG1075
S 909 910 911 912	Switch		CSG1075
S 913 914 919 920	Switch		CSG1041
S 915 916 917 918	Switch		CSG1075
S 921 922 923	Switch		CSG1041
S 925 926 927	Switch		CSG1075
EL 901	EL		CEL1441
LCD901	LCD		CAW1326

====Circuit Symbol & No. Part Name=====	Part No.
RESISTORS	
R 901 908 915 922 928 961	RS1/10S472J
R 902 909 916 923 929	RS1/10S821J
R 903 910 917 924 930	RS1/10S122J
R 904 911 918 925 931	RS1/10S182J
R 905 912 919 926	RS1/10S302J
R 906 913 920 927	RS1/10S622J
R 907 914 921	RS1/10S223J
R 942 943 944 945	RS1/10S222J
R 946 954	RA4C102J
R 950 952 958	RS1/10S102J
R 951	RS1/10S153J
R 953	RS1/10S473J
R 962	RS1/10S101J

CAPACITORS

C 901 903	CSZSR100K6R3
C 902 905	CKSQYB103K25
C 904	CKSQYB104K16

Unit Number : CWM4455
Unit Name : Switch Unit

MISCELLANEOUS

S 951 952 953	Switch	CSG-212
IL 951 952	Lamp 14V/40mA	CEL1435
IL 953 954	Lamp 14V/40mA	CEL1436

CAPACITORS

C 951 952	CKSQYB103K25
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Unit Number : CWM4528
Unit Name : Deck Unit

MISCELLANEOUS

IC 251	CXA1911Q
IC 351	PA2020A
Q 351	2SB1260
Q 352	2SC4102
D 351	MA141K

VR 301 302	Semi-fixed 22kΩ(B)	CCP1129
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RESISTORS

R 255 256	RS1/16S181J
R 271	RS1/16S183J
R 272	RS1/16S203J
R 273 274 275 276 321 322 351 352 353 354	RS1/16S102J
R 277 281 282 283 284 373 374 375	RS1/8S0R0J

R 278 301 302 371 404	RS1/16S0R0J
R 355	RS1/10S274J
R 356	RS1/10S202J
R 357	RS1/10S472J
R 358 359	RS1/10S103J

R 360	RS1/10S102J
R 361	RS1/10S622J
R 372	RS1/10S0R0J
R 401	RS1/16S821J
R 402	RS1/16S392J

R 403	RS1/16S105J
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CAPACITORS

C 251 252 253 254	CKSRYB391K50
C 255 256	CKSRYB103K50
C 257 258	CEV470M6R3
C 271 307 308	CKSQYB104K16
C 272 301 302	CEV100M16

====Circuit Symbol & No. Part Name=====	Part No.
C 303 304	CEV010M50
C 305 306	CKSQYB683K16
C 322	CEV100M16
C 351	CKSYB224K25
C 352	CKSQYB392K50
C 353 356	CKSQYB103K50
C 354	CKSQYB473K50
C 355	CKSYB104K50
C 401	CCSRCH151J50
C 402	CKSYB684K16
C 403	CKSYB333K25
C 404	CKSRYB333K16

Remote Control Unit
Consists of
•Switch P.C.Board(A)
•Switch P.C.Board(B)

Unit Number : CWM4651
Unit Name : Remote Control Unit

MISCELLANEOUS

IC 1	PD9011A
Q 1	2SC2412K
Q 2	2SD1664
D 1	SE303AC
D 2	SIR-33ST

X 1	Ceramic Resonator 480kHz	CSS1335
S 1 2 3 4	Push Switch	CSG1061
S 5 6 7 8	Push Switch	CSG1061
S 9 10 11 12	Push Switch	CSG1061
S 13 14 15 16	Push Switch	CSG1061
S 17 18 22 23	Push Switch	CSG1061
S 24	Push Switch	CSG1061

RESISTORS

R 1	RS1/10S222J
R 2	RS1/10S820J
R 3	RS1/10S123J
R 4	RS18S2R0J
R 5	RS18S5R1J

CAPACITORS

C 1	CEV470M6R3
C 2	CKSQYB104K16

Unit Number : CWR1064
Unit Name : Transformer Unit

T 1801	Transformer	CTT1052
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Unit Number : CWX1910
Unit Name : Control Unit

MISCELLANEOUS

IC 1001	UP02571GS
IC 1201	UPL63700GF1
IC 1301	PA326
IC 1302	XR45285FP
IC 1303	NJ44558M
IC 1603	PD401A
IC 1701	PD490A
IC 1902	PQ6T251
Q 1001	2SE1132
Q 1603	2SE109A

====Circuit Symbol & No. Part Name=====	Part No.	====Circuit Symbol & No. Part Name=====	Part No.
Q 1701	UN2111	C 1006 1023	CKSRYB561K50
D 1801 1802	CL200IRX	C 1007 1902	CKSYB334K16
D 1901 1902 1903 1904	SC016-2	C 1009	CCSRCH181J50
L 1701	LCTB4R7K2125	C 1013	CKSRYB103K50
TH1701	CCX1015	C 1014	CCSRCH220J50
X 1701	CSS1354	C 1015 1016 1017 1018	CKSYF105Z16
S 1801 1802	CSN1028	C 1021	CKSYB104K50
VR1001	CCP1177	C 1022	CKSRYB332K50
VR1002	CCP1183	C 1201 1202	CKSYF105Z16
VR1003	CCP1185	C 1203	CKSRYB102K50
VR1004	CCP1185	C 1301 1302	CKSRYF683Z25
	CKF1031	C 1304	CKSRYB152K50
RESISTORS		C 1305	CKSRYB271K50
R 1001	RS1/8S100J	C 1307 1308	CKSRYB103K50
R 1002	RS1/8S120J	C 1309 1311	CEV101M10
R 1003 1201 1307 1610 1702	RS1/16S103J	C 1310 1616	CKSRYB103K50
R 1004 1024 1025 1315 1318 1719	RS1/16S102J	C 1601	CCSRCH151J50
R 1005	RS1/16S823J	C 1704	CKSRYB472K50
R 1006	RS1/16S182J	C 1901	CEV220M16
R 1007	RS1/16S333J	C 1903	CKSYB224K16
R 1011 1012	RS1/16S683J	Unit Number :	
R 1013 1311	RS1/16S102J	Unit Name : Drive Assy	
R 1014 1310 1725 1728	RS1/16S473J	S 998 999	Switch(Close,Open)
R 1018 1020	RS1/16S622J	M 1	Motor
R 1019	RS1/16S563J	Unit Number :	CSN1022
R 1021	RS1/16S513J	Unit Name : Detector P.C.Board	CXM1085
R 1022	RS1/16S133J	P 1 2	Photo-Transistor
R 1026	RS1/16S102J	Unit Number :	PT4800
R 1027	RS1/16S183J	Unit Name : P.C.Board Unit	
R 1028	RS1/16S822J	S 1 2	Switch(70 μ S,Load)
R 1029	RS1/16S0R0J	EGN 1	Photo-Interlapter
R 1301 1302	RS1/16S222J	R 1	ESG1004
R 1303	RS1/16S223J	Unit Number :	EGN1005
R 1304	RS1/16S123J	Unit Name : Reel P.C.Board	RD1/4HM181J
R 1305 1306	RS1/16S332J	EGN 2 3	Photo-Reflector
R 1308	RS1/16S163J	Miscellaneous Parts List	
R 1309	RS1/16S103J	S 1	Switch(Cassette Sense)
R 1317 1727	RS1/16S473J	M 1	Motor Unit(Spindle)
R 1319 1320	RS1/16S102J	M 2	Motor Unit(Carriage)
R 1601	RS1/16S301J	M 3	Motor Unit>Loading)
R 1703 1704 1715 1718	RS1/16S222J	PU Unit	CGY1031
R 1706	RS1/16S303J	M 1	Motor Unit(Main)
R 1707 1708	RS1/16S473J	M 2	Motor Unit(Sub)
R 1709	RS1/16S122J	HD 1	Head Assy
R 1710	RS1/16S472J		EXA1428
R 1716 1717	RS1/16S104J		EXA1382
R 1720 1723	RS1/16S681J		EXA1404
R 1721 1722 1724	RS1/16S681J		
R 1801 1802	RS1/8S821J		
CAPACITORS			
C 1001 1008 1010 1011 1303	CKSRYB102K50		
C 1002 1904	CEV101M6R3		
C 1003 1703	CKSQYB104K16		
C 1004	CEV470M6R3		
C 1005	CCSRCH101J50		

8. LCD

● CAW1326
SEGMENT

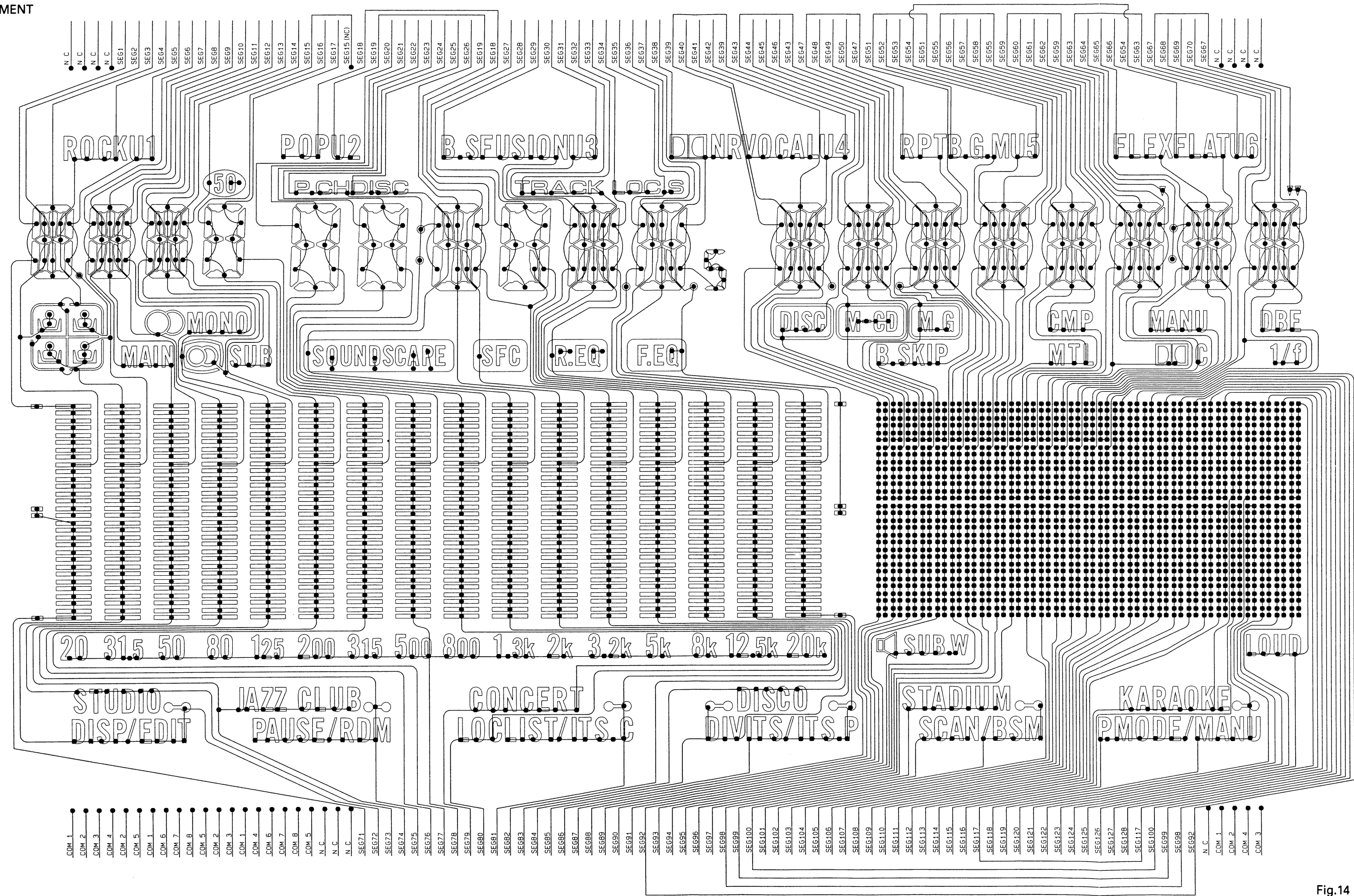


Fig.14

COMMON

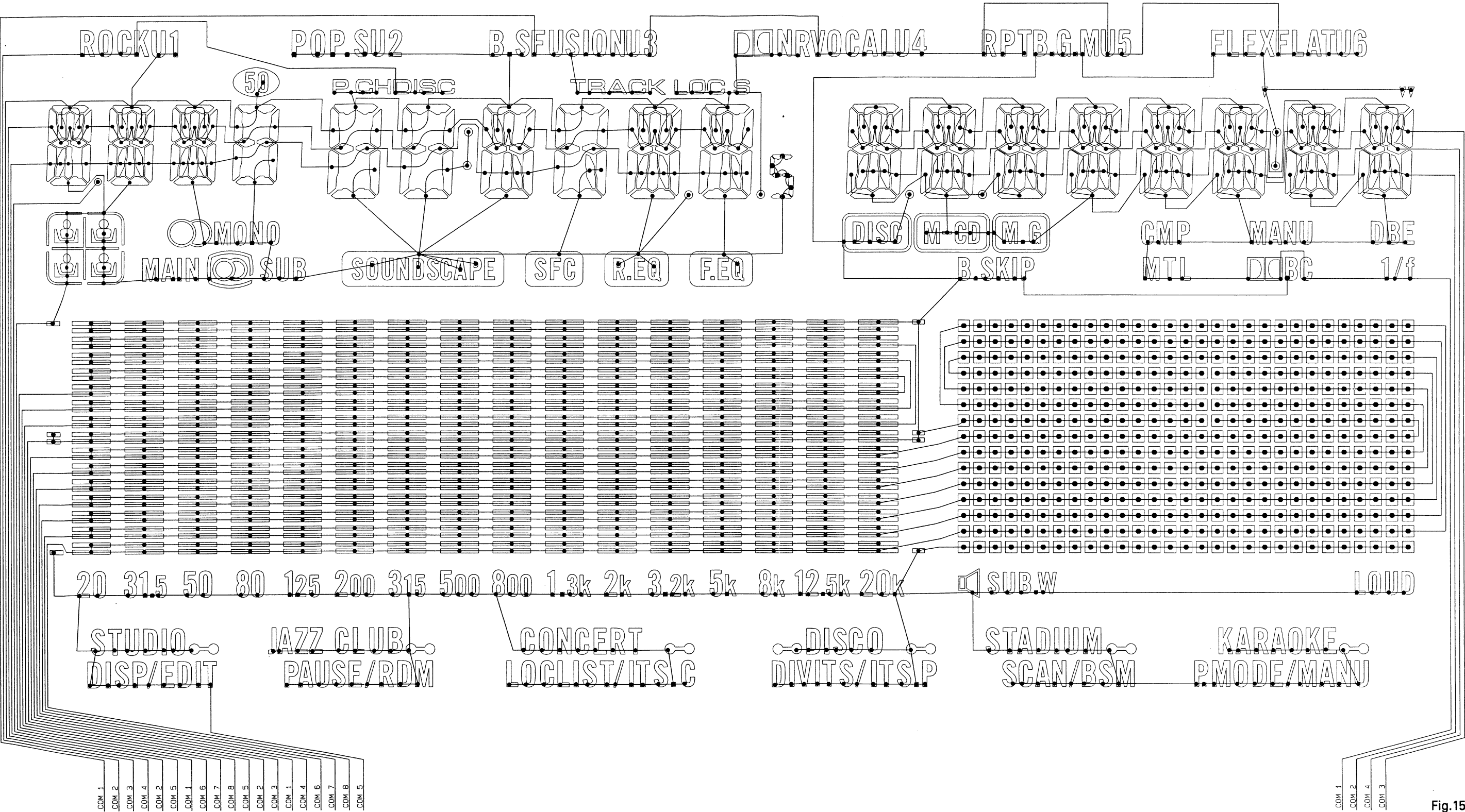


Fig.15

9. BLOCK DIAGRAM

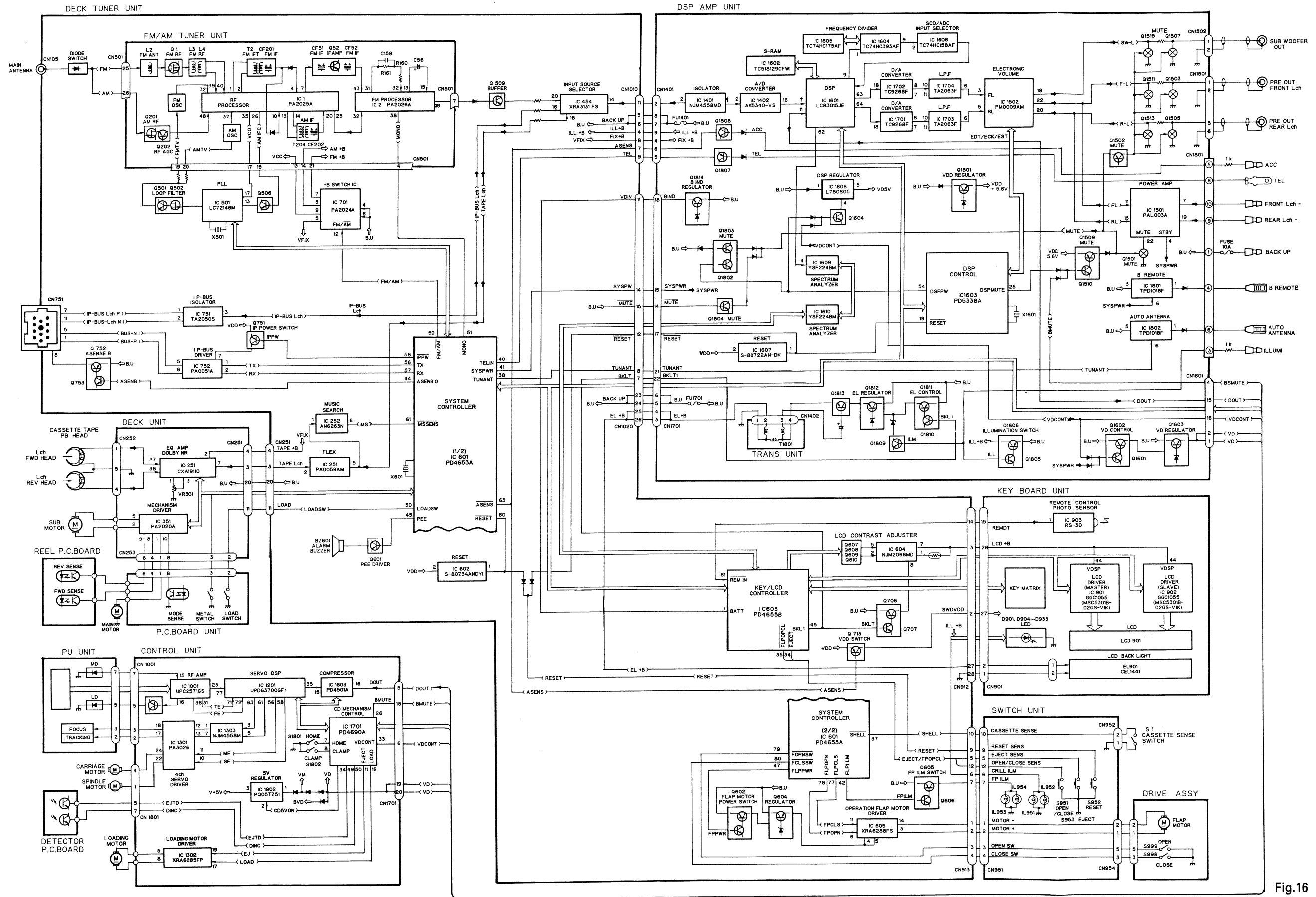
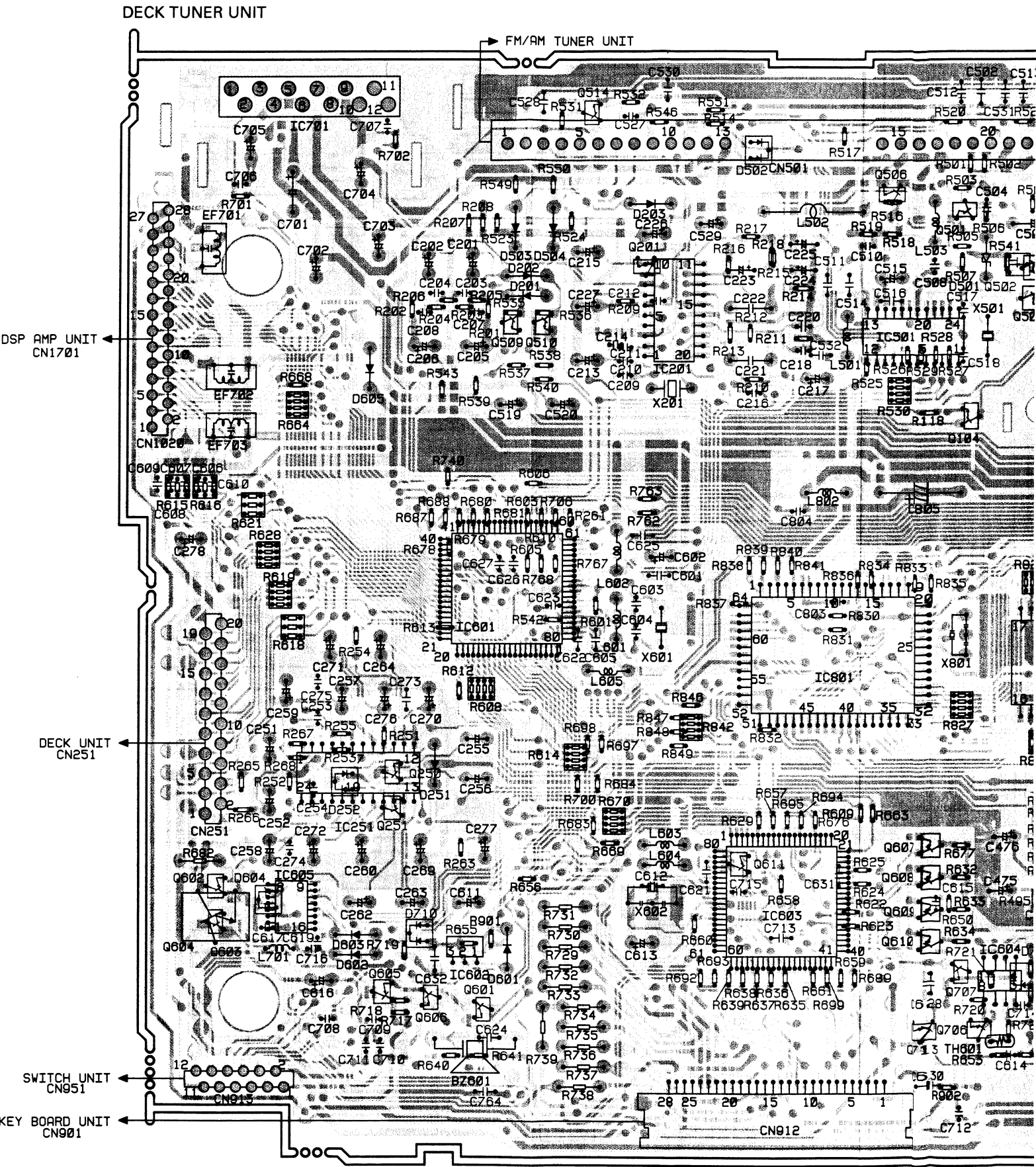
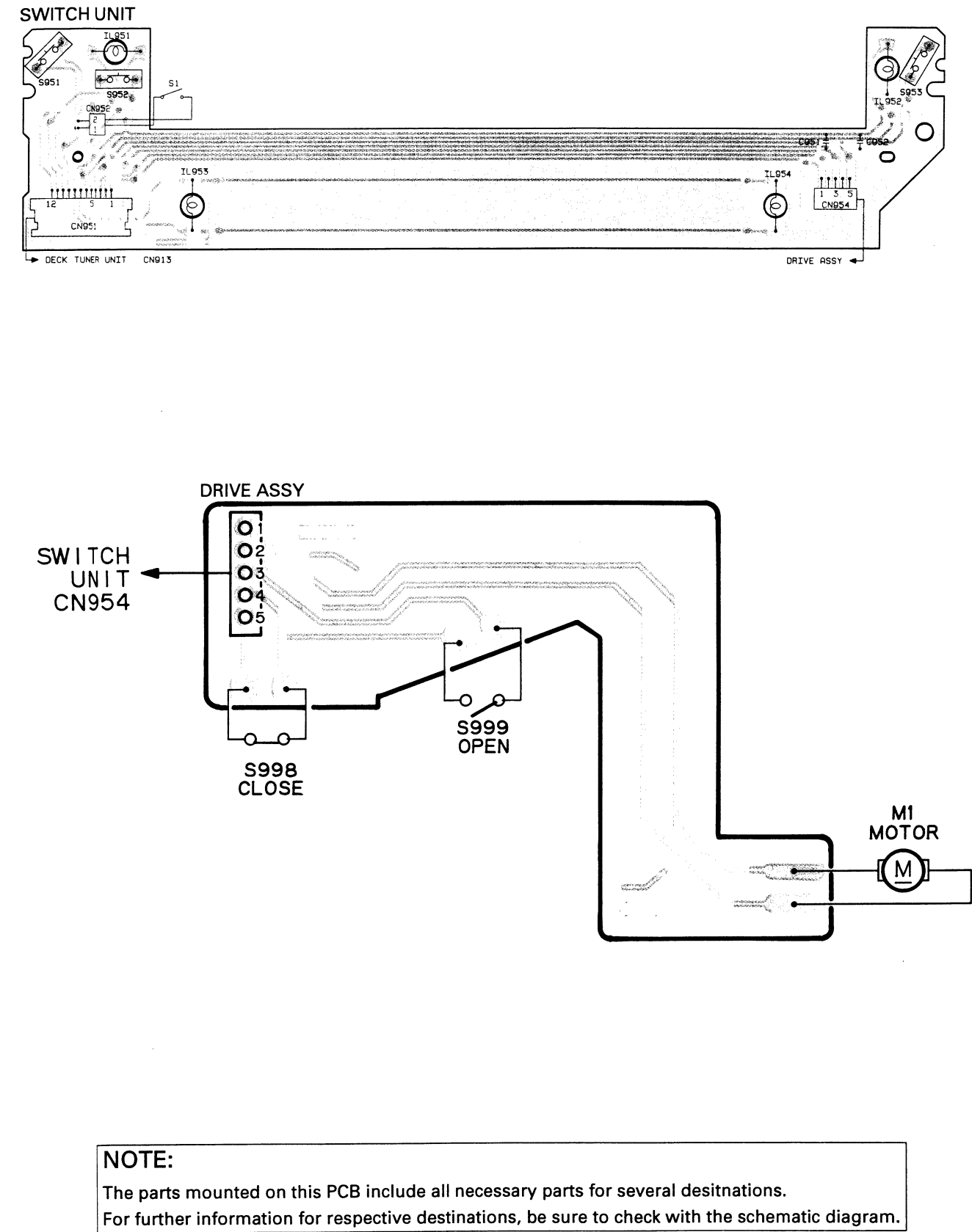


Fig.16



10. CONNECTION DIAGRAM



DECK TUNER UNIT

ADJ IC, Q

IC701
Q514 Q507

Q506
Q501

Q201
Q503 Q502 Q102
Q504
IC201 Q103 IC101
Q509 Q510 IC501
Q101

IC751
Q104

Q751 IC752

IC601 Q752 Q753

IC801 IC802 IC252

Q704

Q250
IC251

Q251

Q607
IC454 Q611
Q602 Q608
IC603
IC605 Q609
Q604 Q603

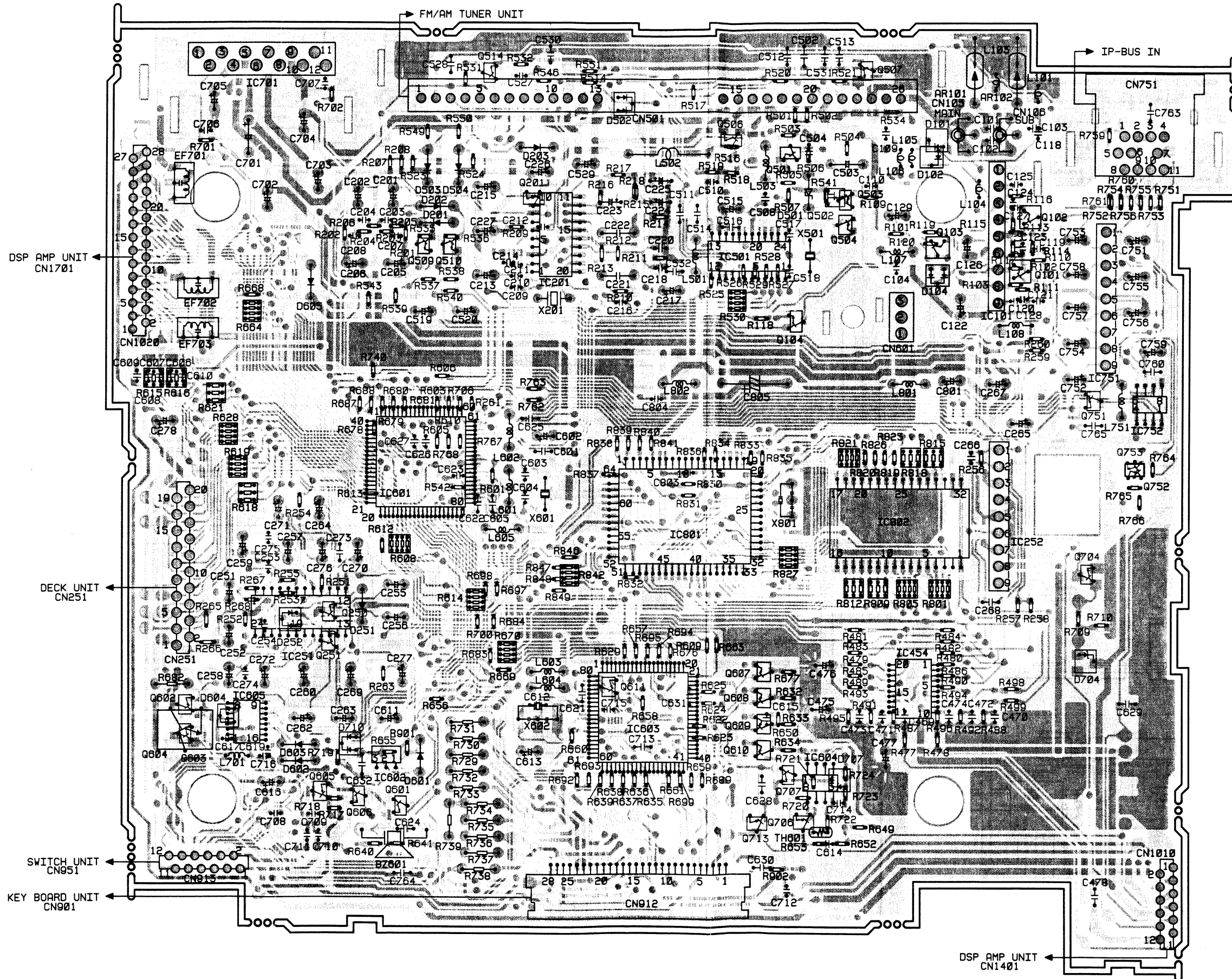
Q610
IC602

IC604 Q707

Q605
Q606
Q601

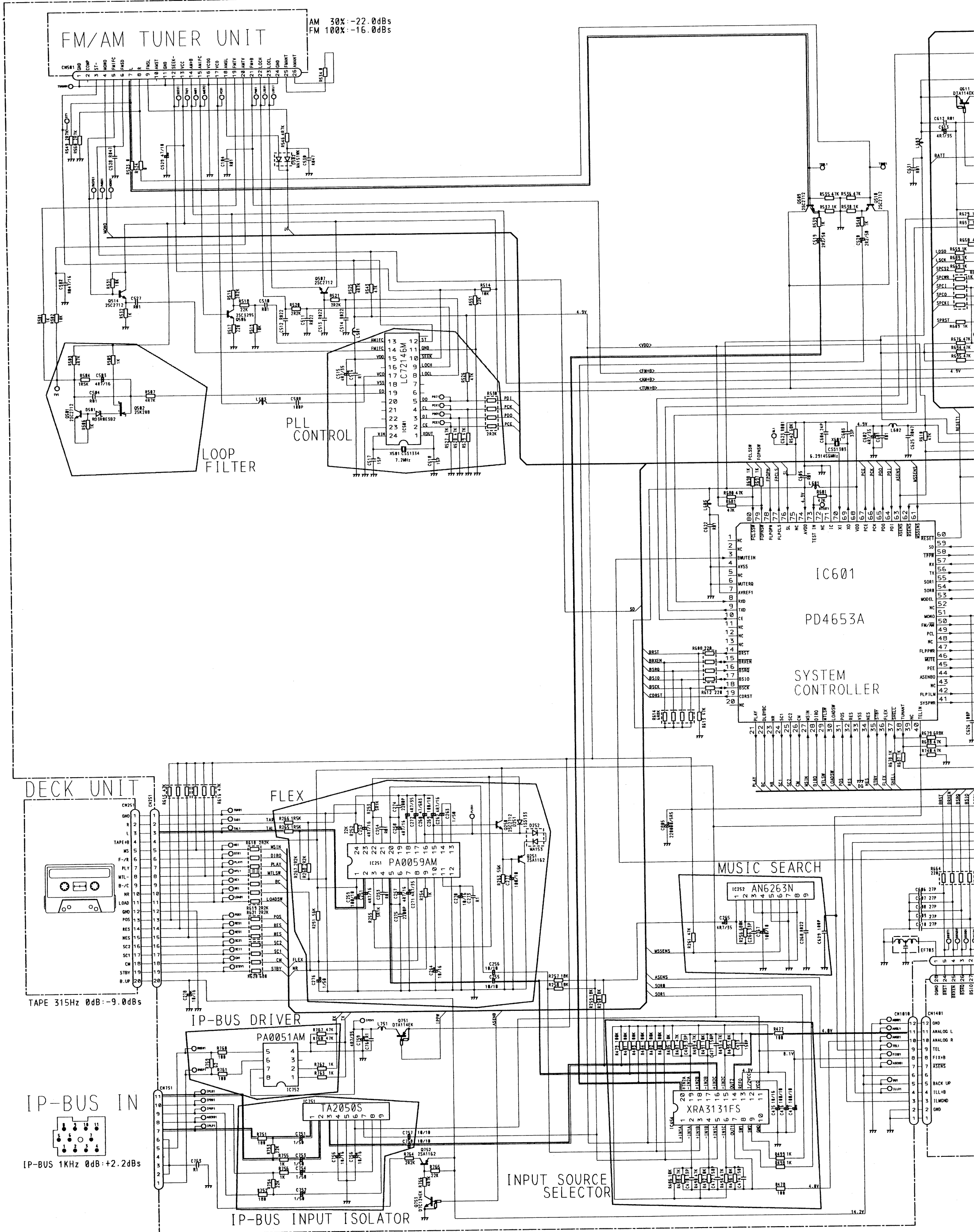
Q713 Q706

Fig.17



11. SCHEMATIC CIRCUIT DIAGRAM

DECK TUNER UNIT



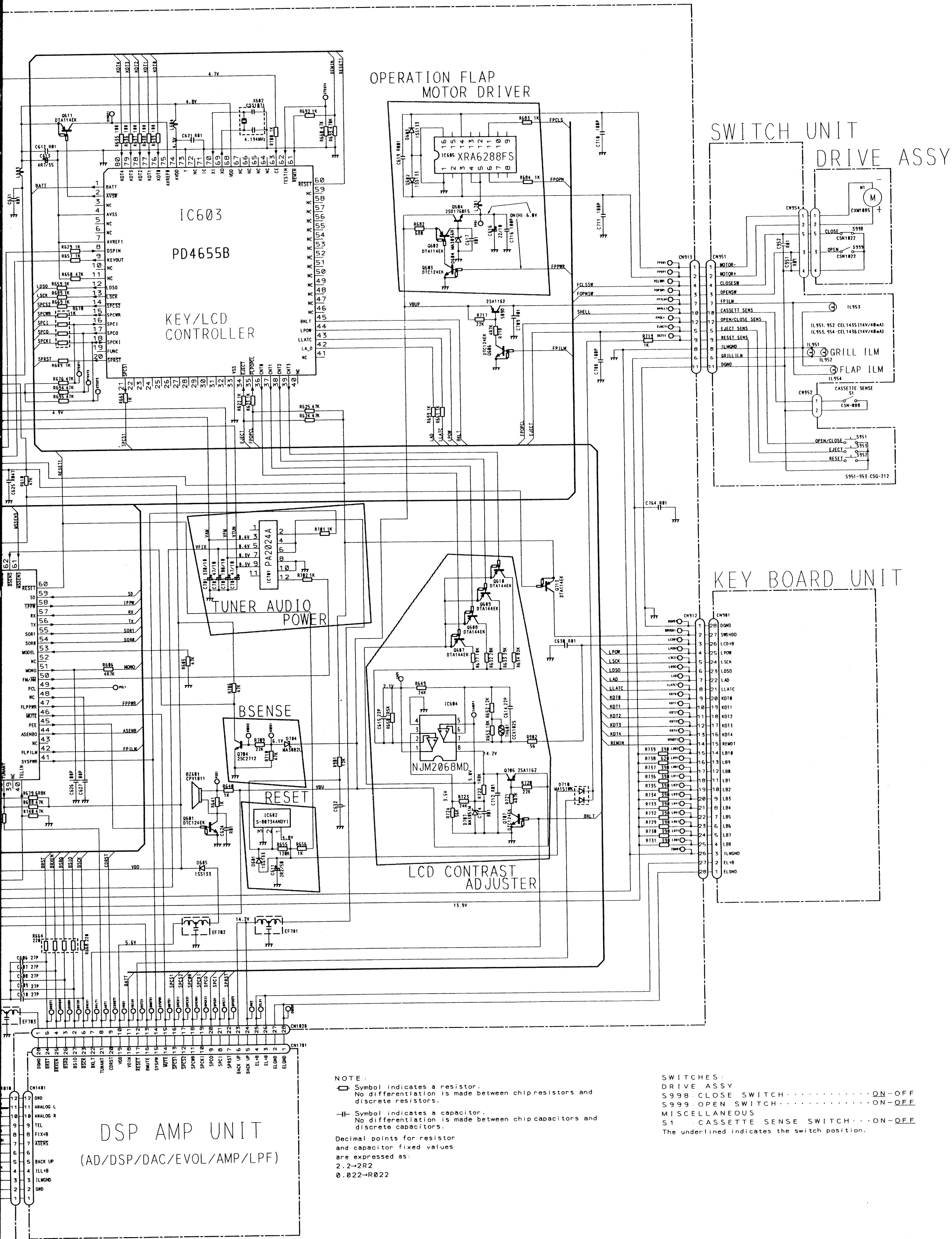


Fig.18

12. CIRCUIT DIAGRAM AND PATTERN

12.1 DSP AMP UNIT, TRANS UNIT

● Circuit Diagram

A

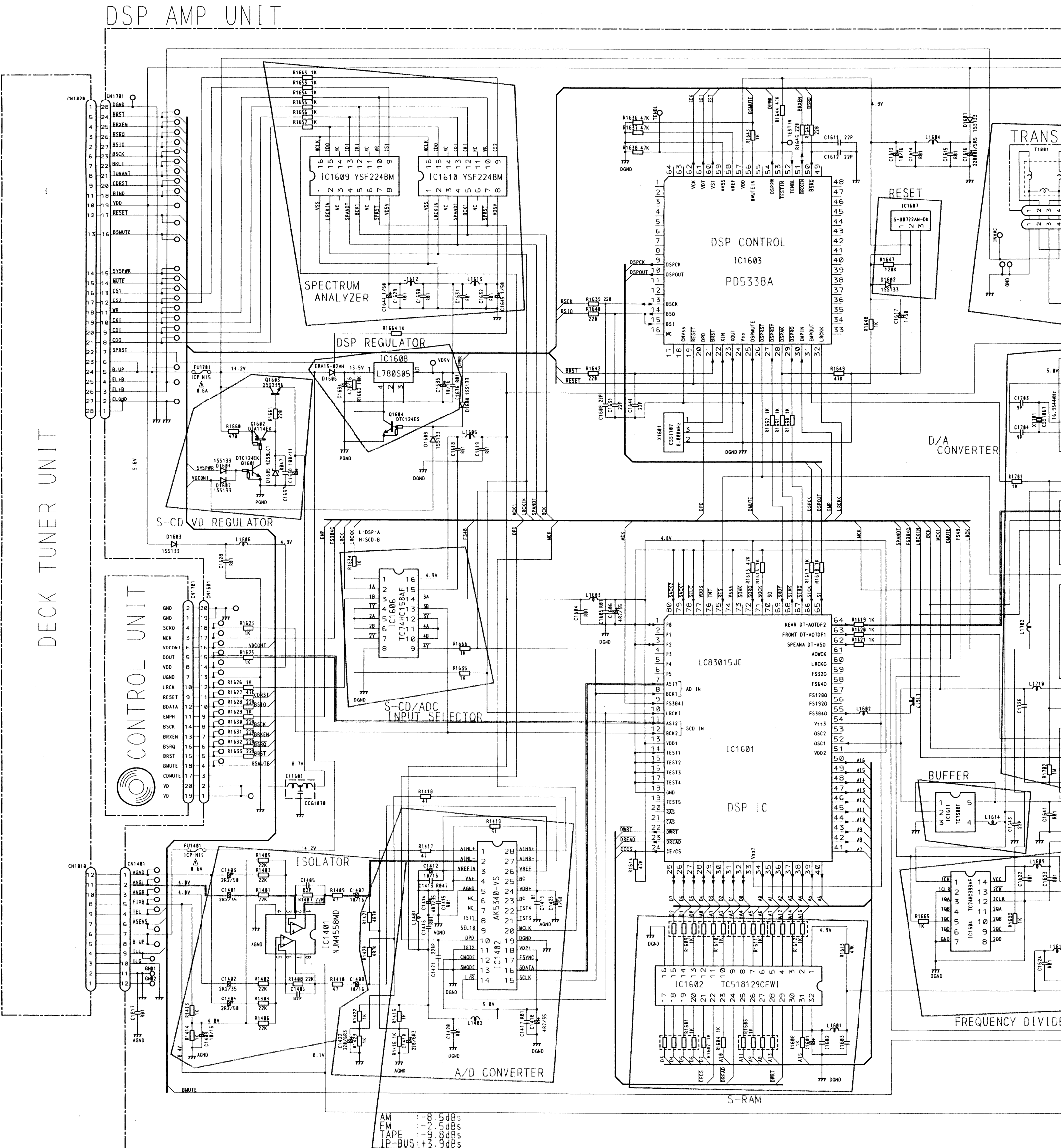
B

C

D

E

F



The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

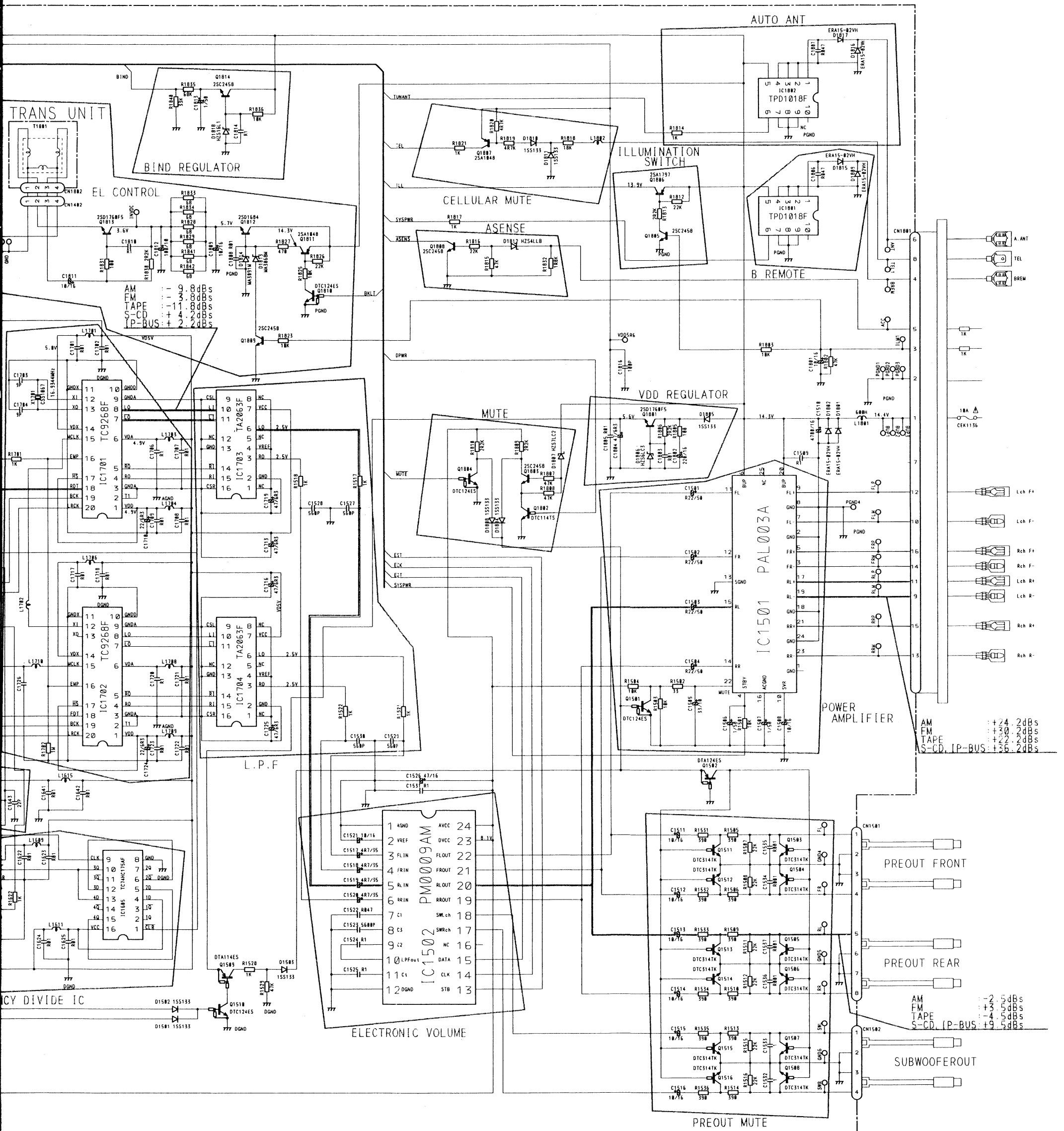
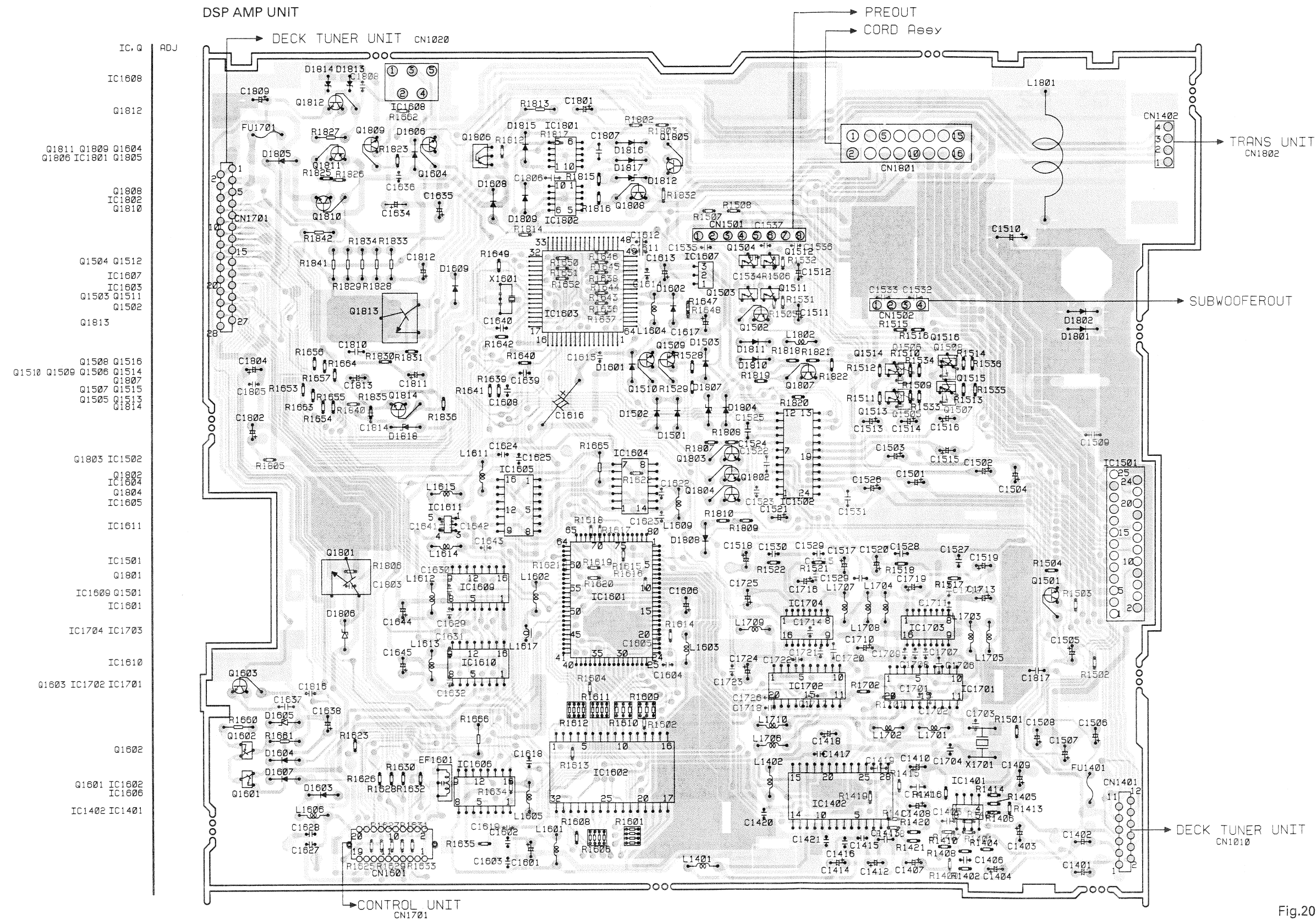


Fig.19

● Connection Diagram



NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

Fig.20

12.2 FM/AM TUNER UNIT

● Connection Diagram

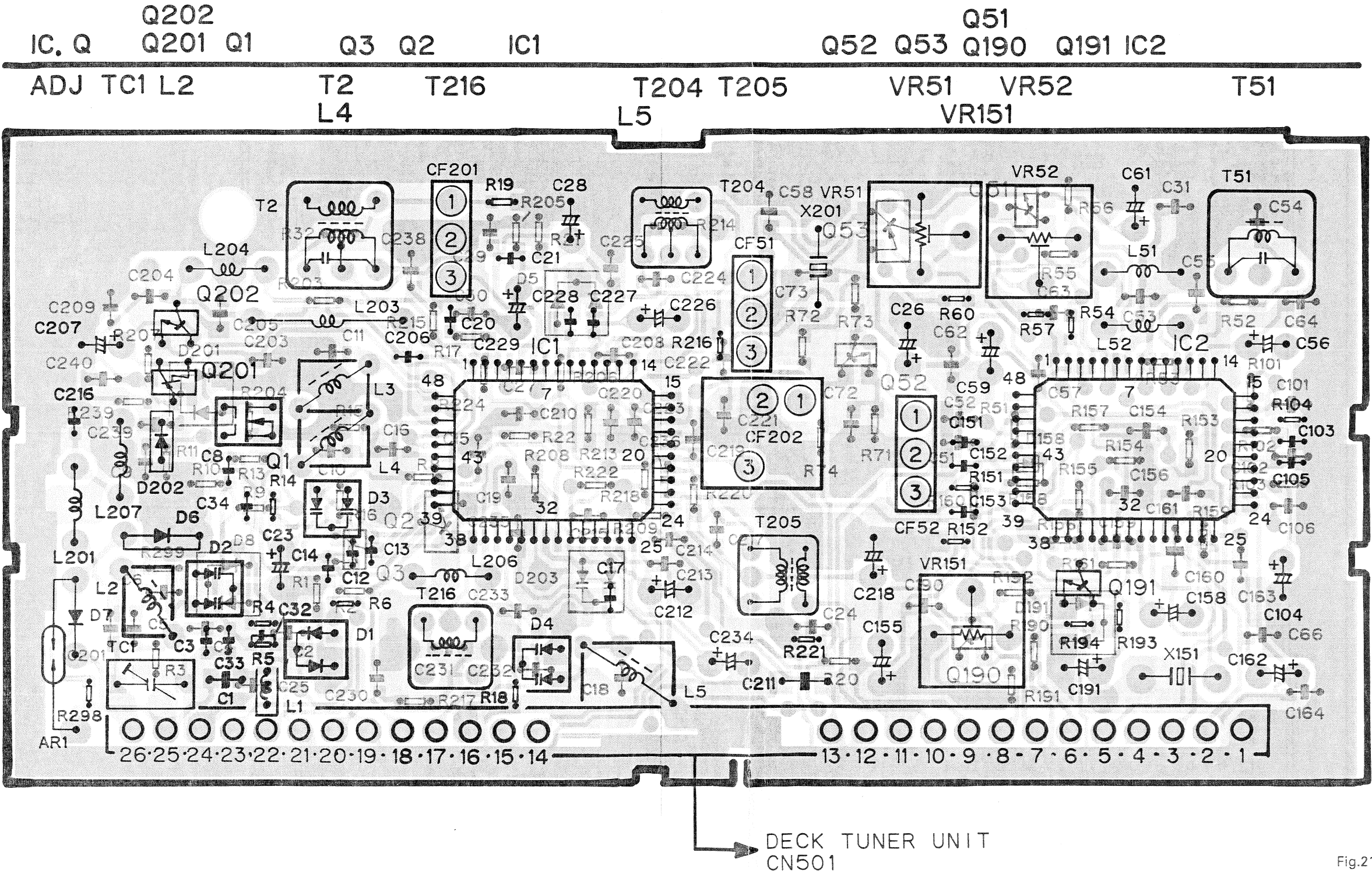


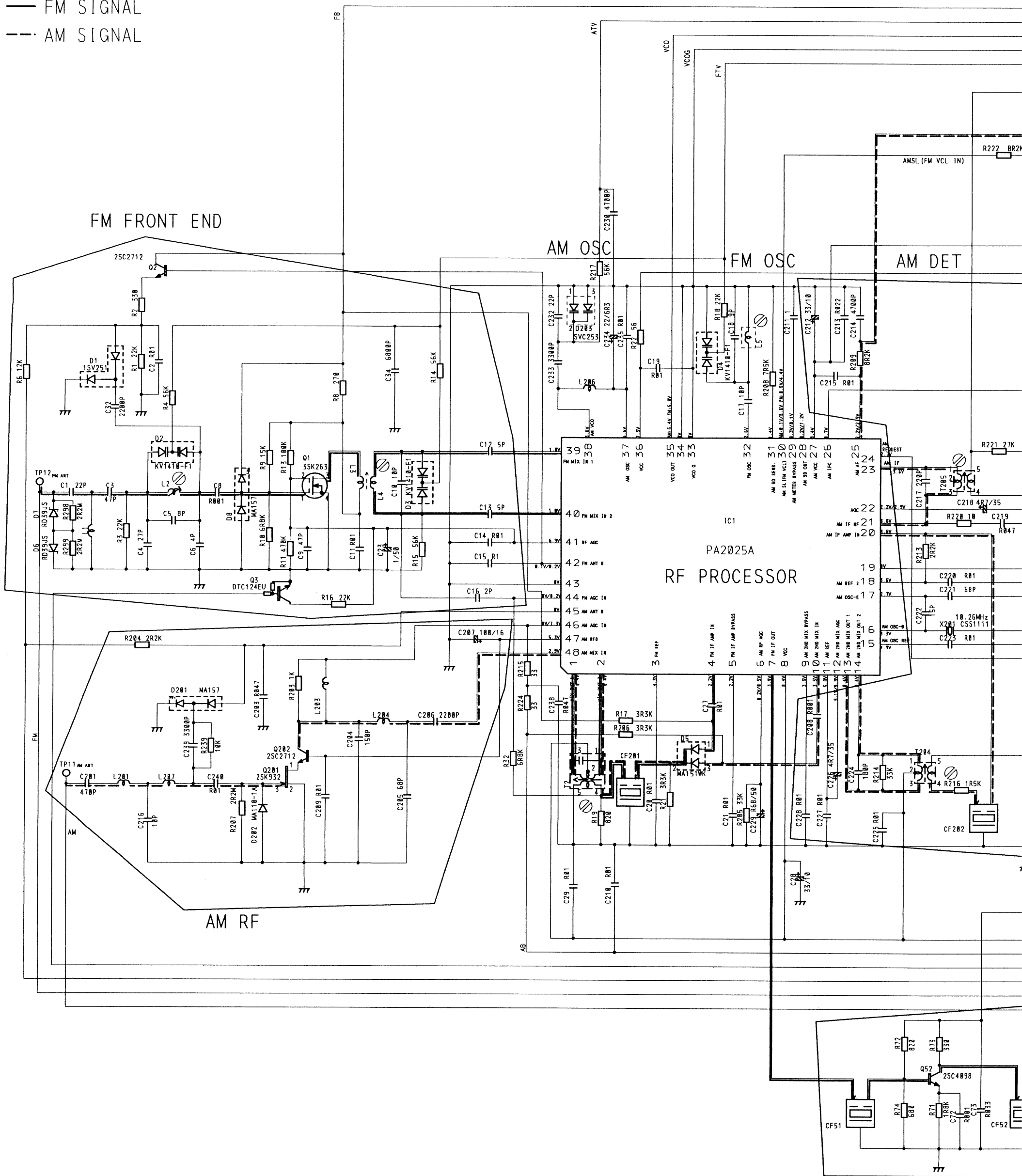
Fig.21

NOTE:

The parts mounted on this PCB include all necessary parts for several destinations.
For further information for respective destinations, be sure to check with the schematic diagram.

FM/AM TUNER UNIT

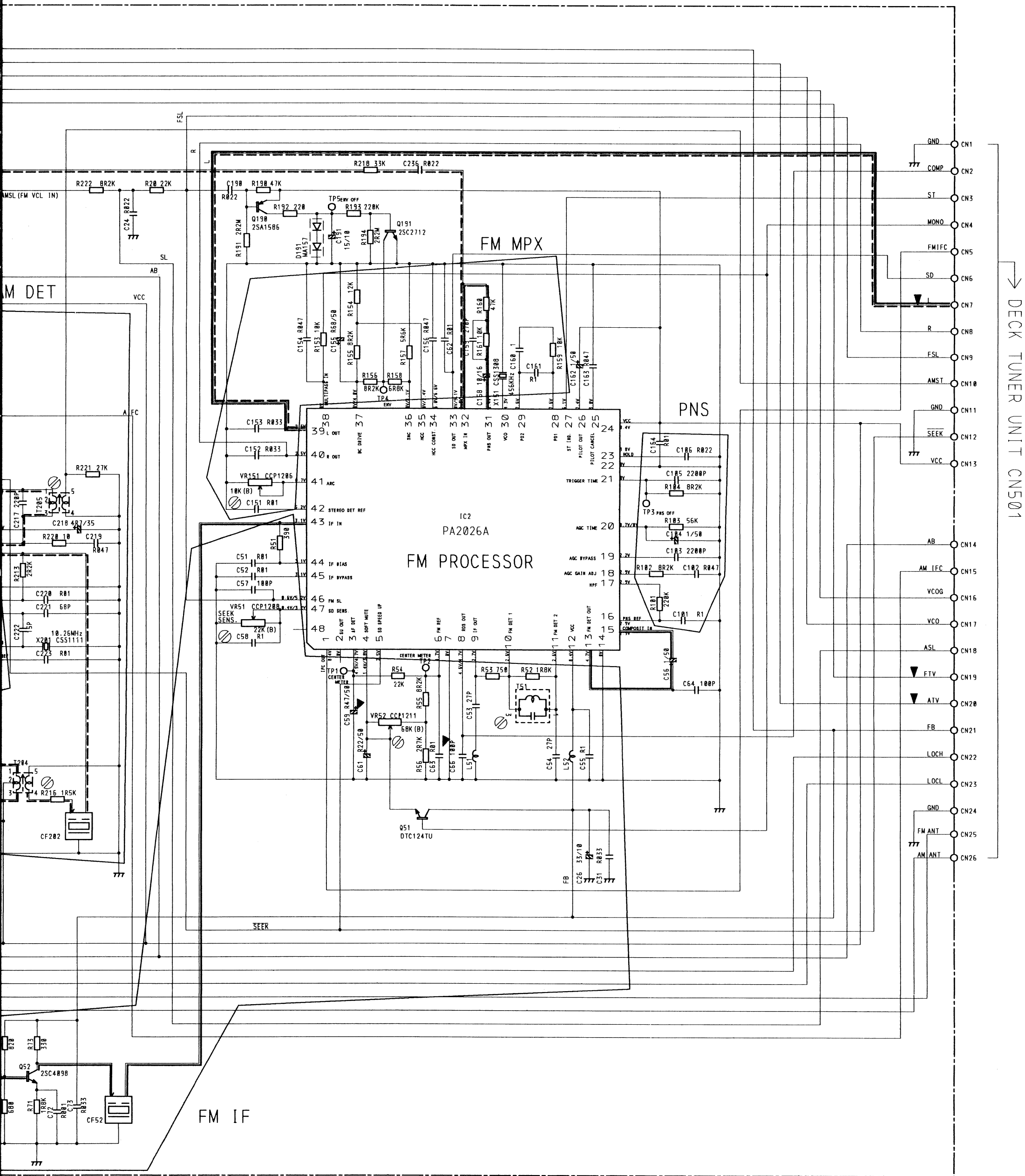
— FM SIGNAL
 --- AM SIGNAL



NOTE :

- Symbol indicates a resistor.
 No differentiation is made between chip resistors and discrete resistors.
- ||— Symbol indicates a capacitor.
 No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:
 2.2→R22
 0.022→R022



→ DECK TUNER UNIT CN501

Fig.22

12.3 CD MECHANISM MODULE

● Circuit Diagram

- SL SIGNAL LINE
- F FOCUS SERVO LINE
- T TRACKING SERVO LINE
- C CARRIAGE SERVO LINE
- S SPINDLE SERVO LINE

CONTROL UNIT

A

B

C

D

E

F

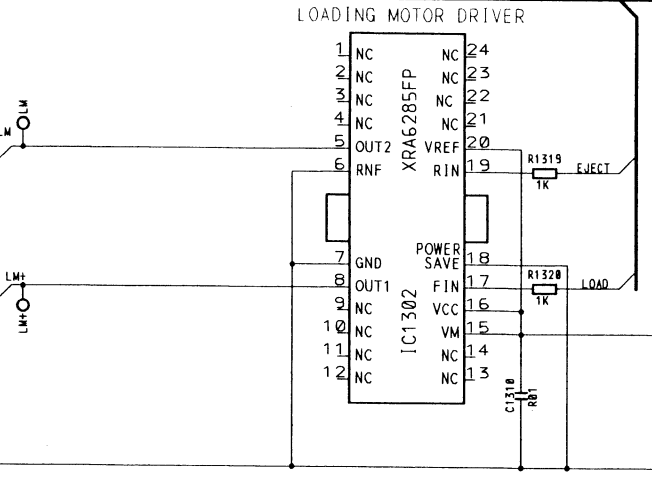
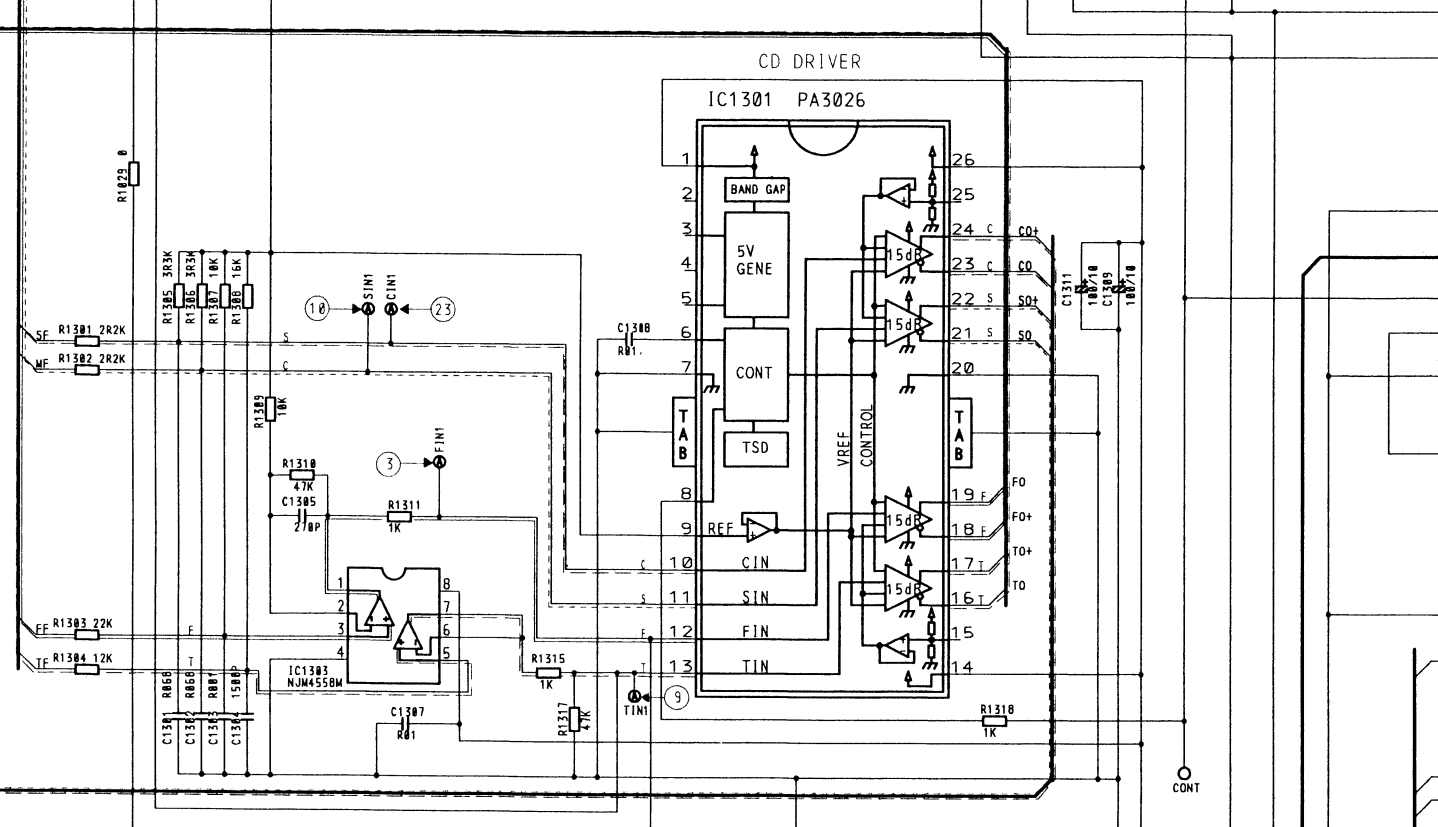
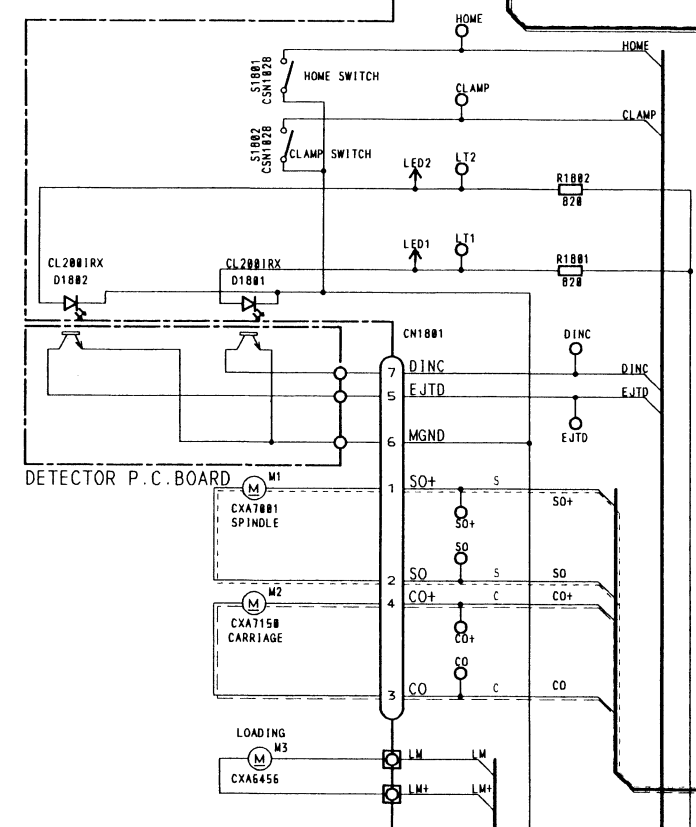
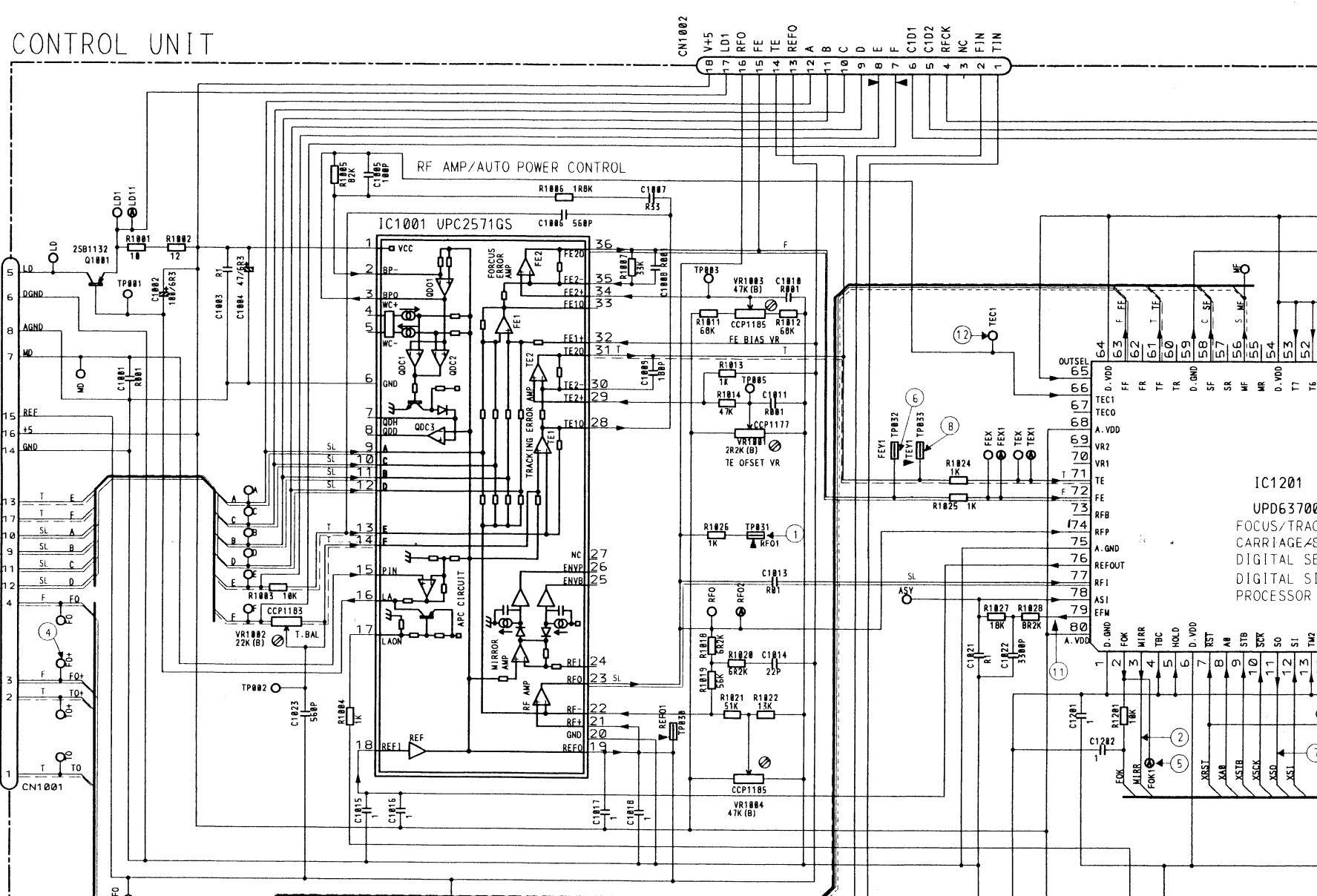
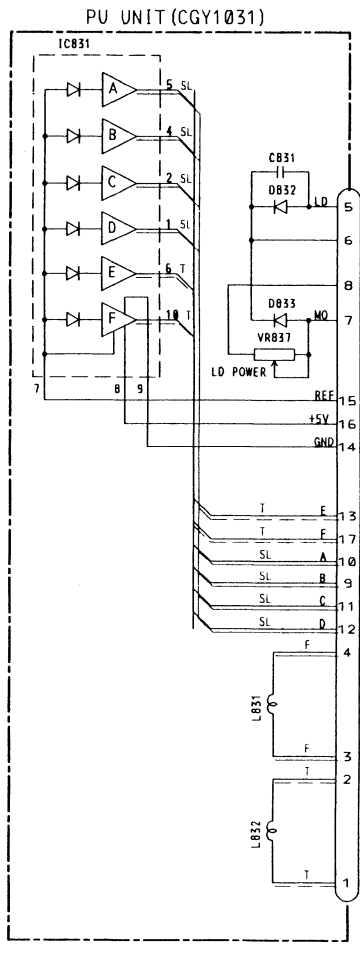




Fig.23

CONTROL UNIT

	IC1302			Q1001			
	IC1301			Q1201			
IC. Q	IC1303	IC1603	Q1701	IC1701	IC1001	IC1902	
			Q1603				
ADJ					VR1003 VR1002		
					VR1001 VR1004		

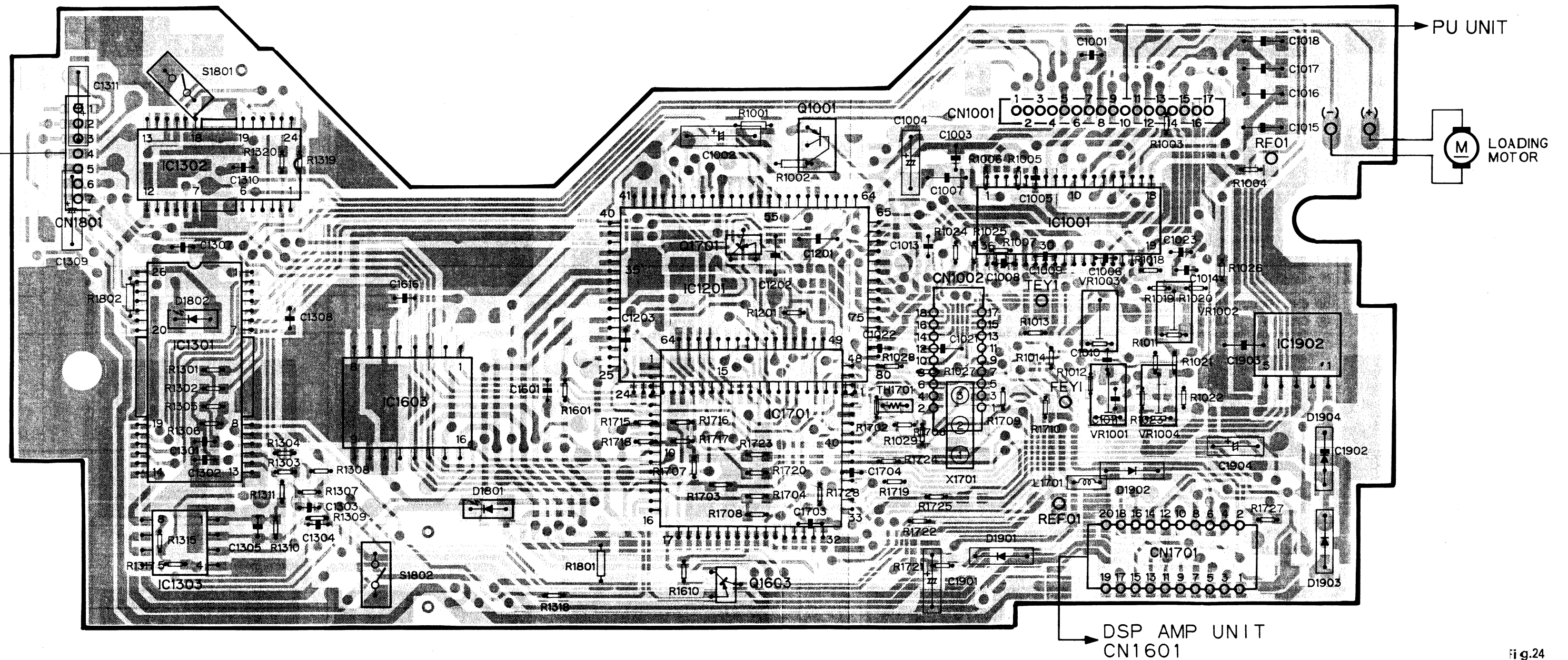
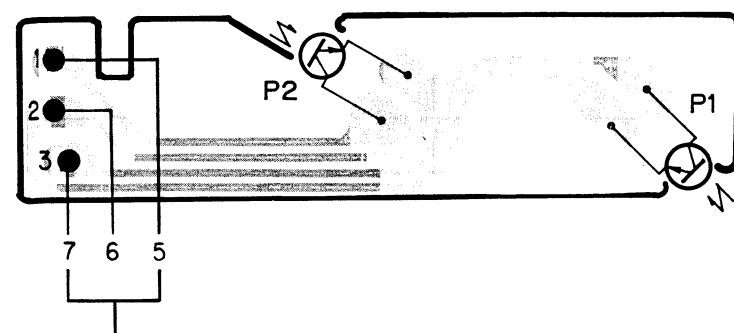
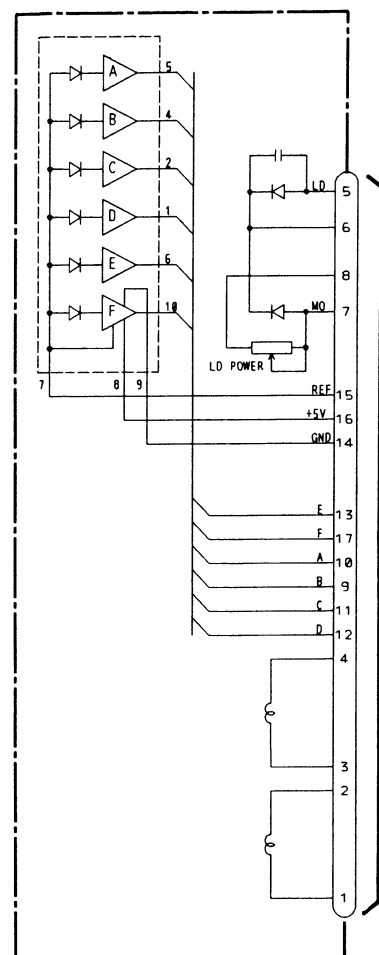


Fig.24

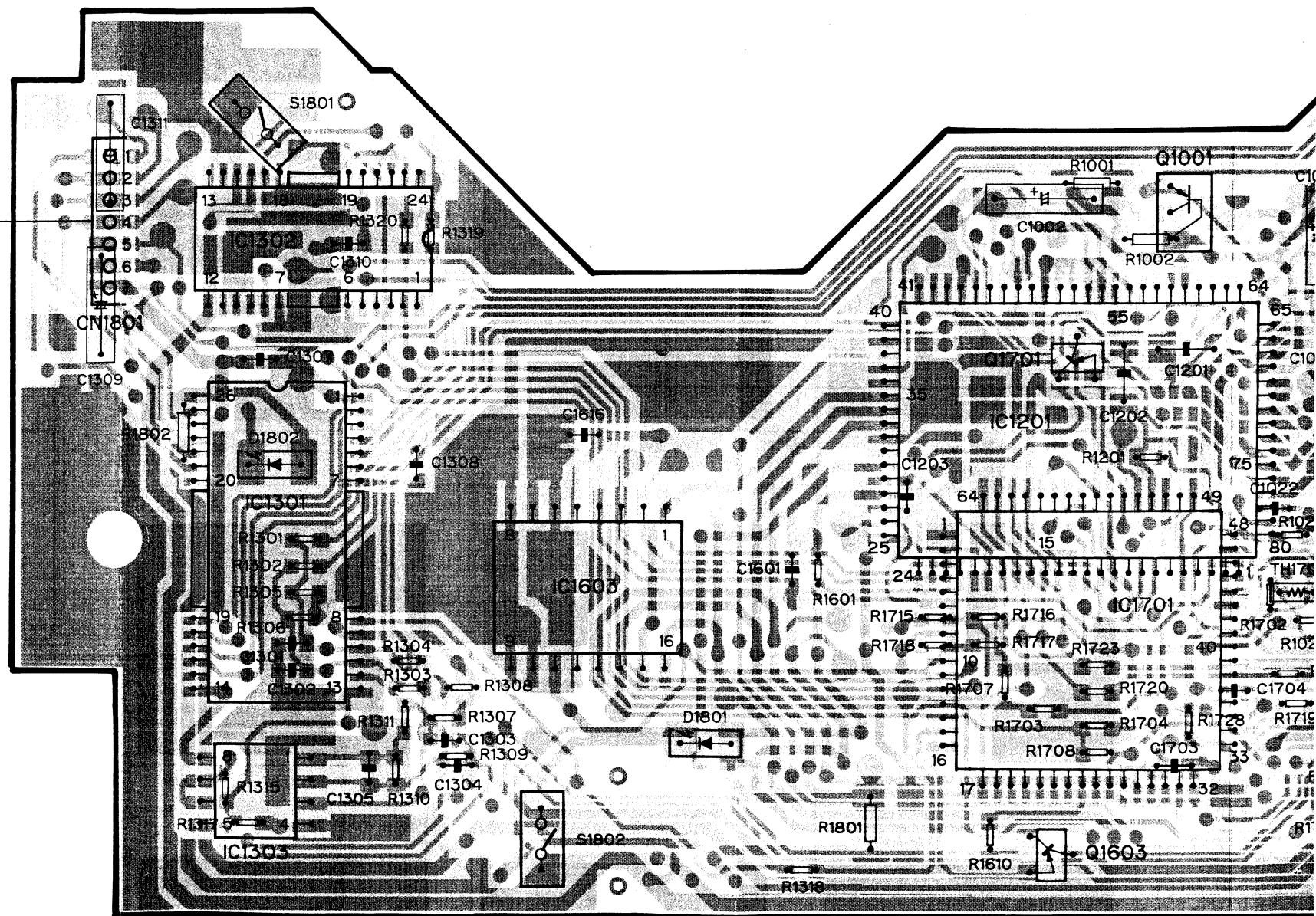
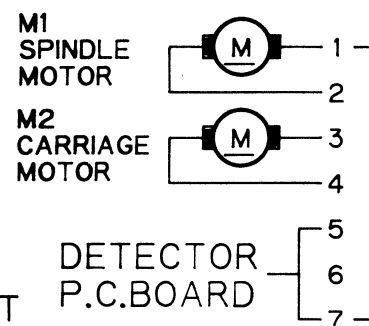
● Connection Diagram



CONTROL UNIT
CN1801

CONTROL UNIT

	IC1302			Q1001
	IC1301		Q1701	IC1201
IC. Q	IC1303	IC1603	Q1603	IC1701
ADJ				



● Wave Forms

Note: 1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFO: 2.5V

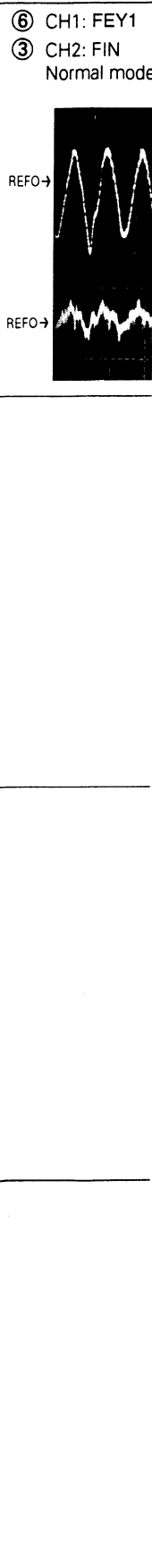
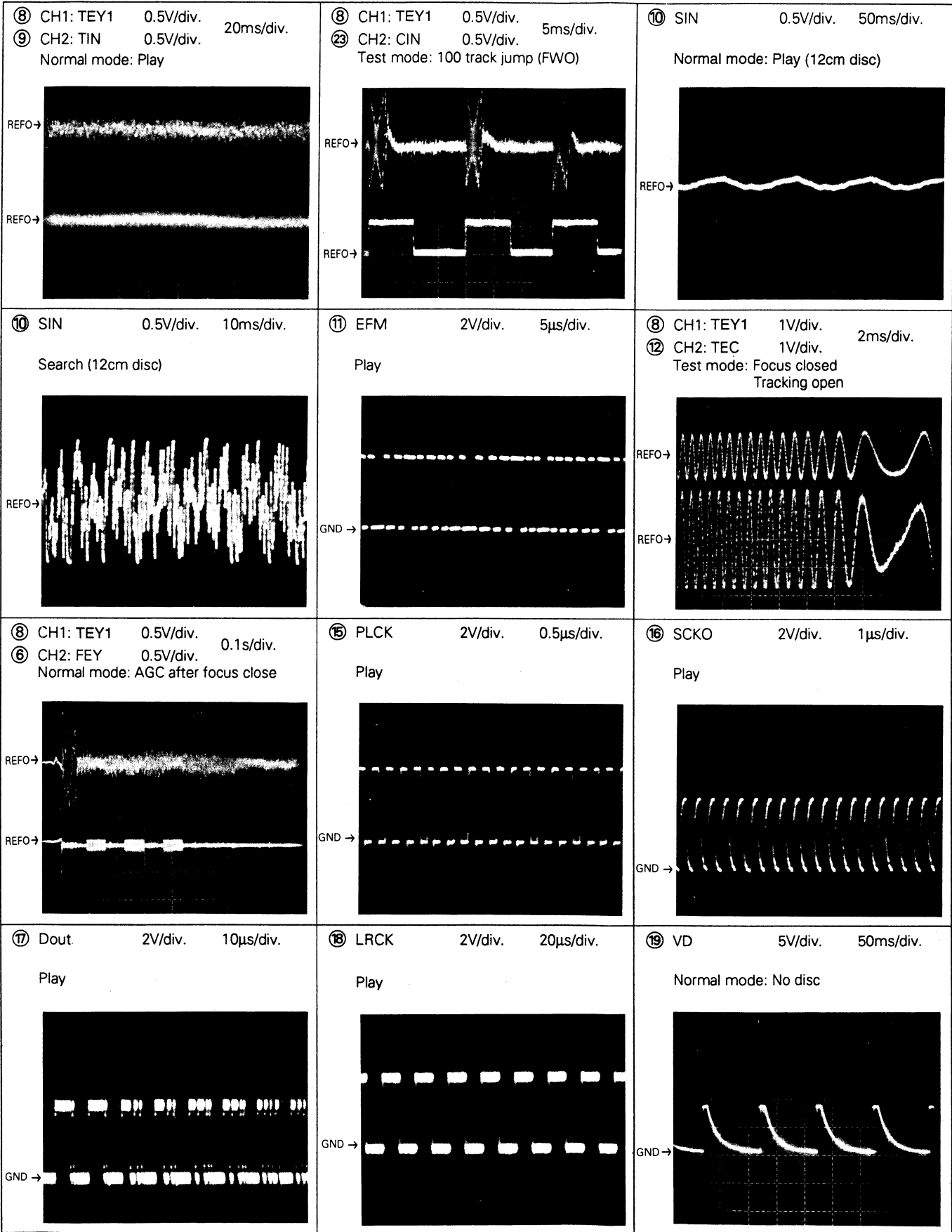
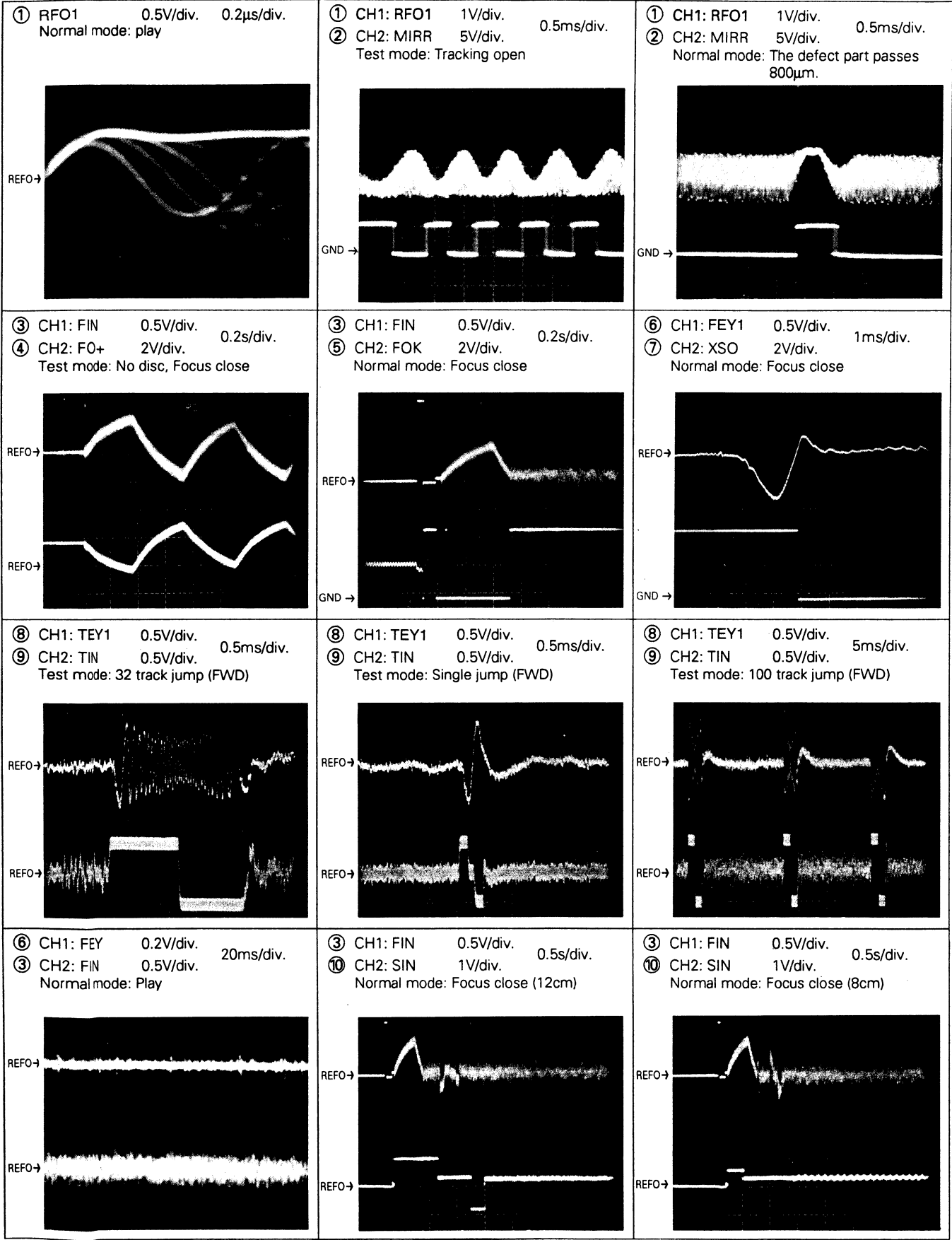


diagram.

ns/div.
asses

/div.

/div.
D)

/div.
)

<p>⑧ CH1: TEY1 0.5V/div. 20ms/div. ⑨ CH2: TIN 0.5V/div. 20ms/div. Normal mode: Play</p>	<p>⑧ CH1: TEY1 0.5V/div. 5ms/div. ⑨ CH2: CIN 0.5V/div. 5ms/div. Test mode: 100 track jump (FWO)</p>	<p>⑩ SIN 0.5V/div. 50ms/div. Normal mode: Play (12cm disc)</p>
<p>⑩ SIN 0.5V/div. 10ms/div. Search (12cm disc)</p>	<p>⑪ EFM 2V/div. 5μs/div. Play</p>	<p>⑧ CH1: TEY1 1V/div. 2ms/div. ⑫ CH2: TEC 1V/div. 2ms/div. Test mode: Focus closed Tracking open</p>
<p>⑧ CH1: TEY1 0.5V/div. 0.1s/div. ⑥ CH2: FEY 0.5V/div. 0.1s/div. Normal mode: AGC after focus close</p>	<p>⑮ PLCK 2V/div. 0.5μs/div. Play</p>	<p>⑯ SCKO 2V/div. 1μs/div. Play</p>
<p>⑰ Dout 2V/div. 10μs/div. Play</p>	<p>⑱ LRCK 2V/div. 20μs/div. Play</p>	<p>⑲ VD 5V/div. 50ms/div. Normal mode: No disc</p>

<p>⑥ CH1: FEY1 1V/div. 1ms/div. ③ CH2: FIN 1V/div. 1ms/div. Normal mode: During AGC</p>	<p>⑧ CH1: TEY1 0.2V/div. 1ms/div. ⑨ CH2: TIN 0.5V/div. 1ms/div. Normal mode: During AGC</p>	

12.4 REMOTE CONTROL UNIT

● Circuit Diagram

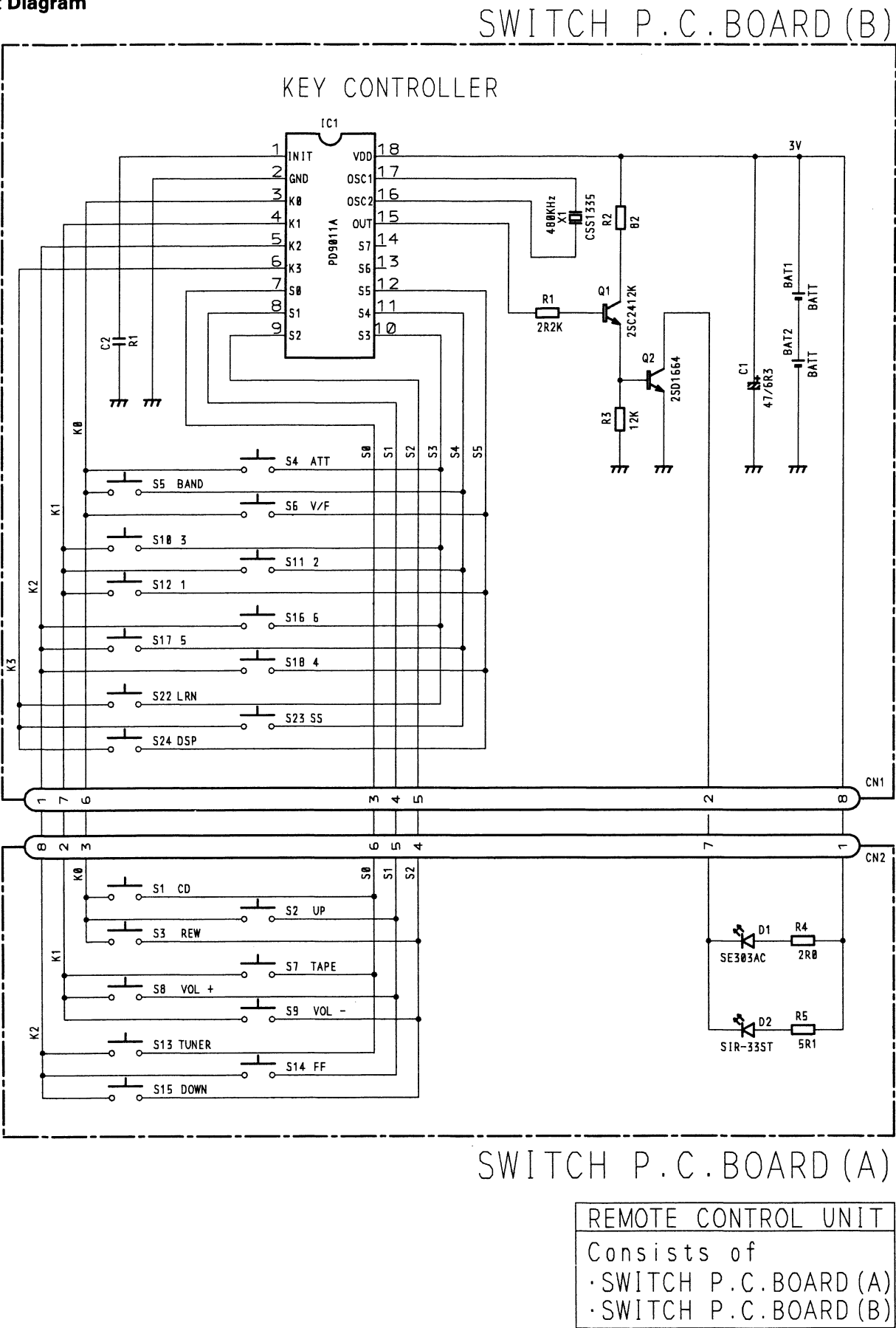


Fig.25

● Connection Diagram

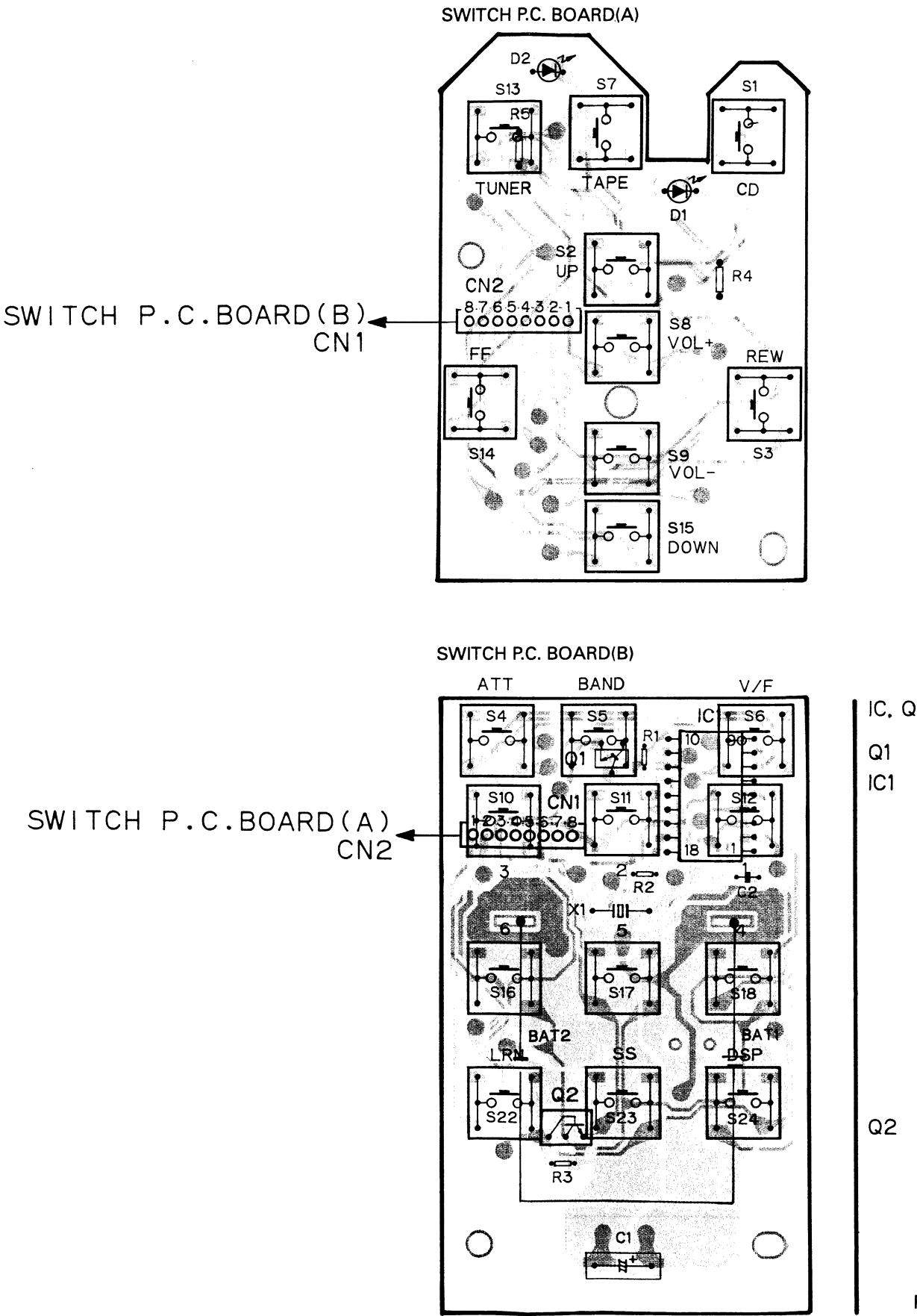


Fig.21

12.5 KEY BOARD UNIT

● Circuit Diagram

KEY BOARD UNIT

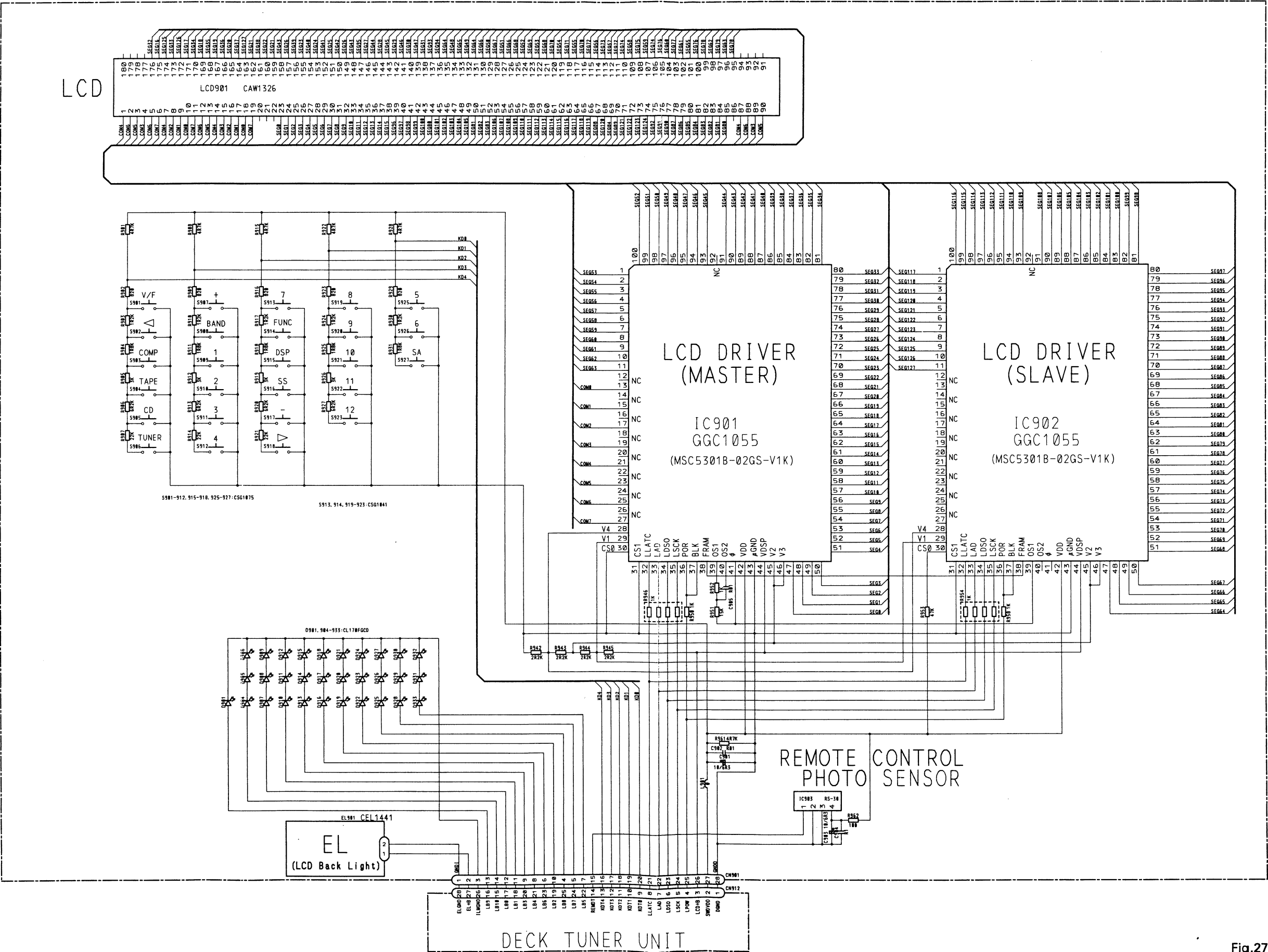


Fig.27

● Connection Diagram

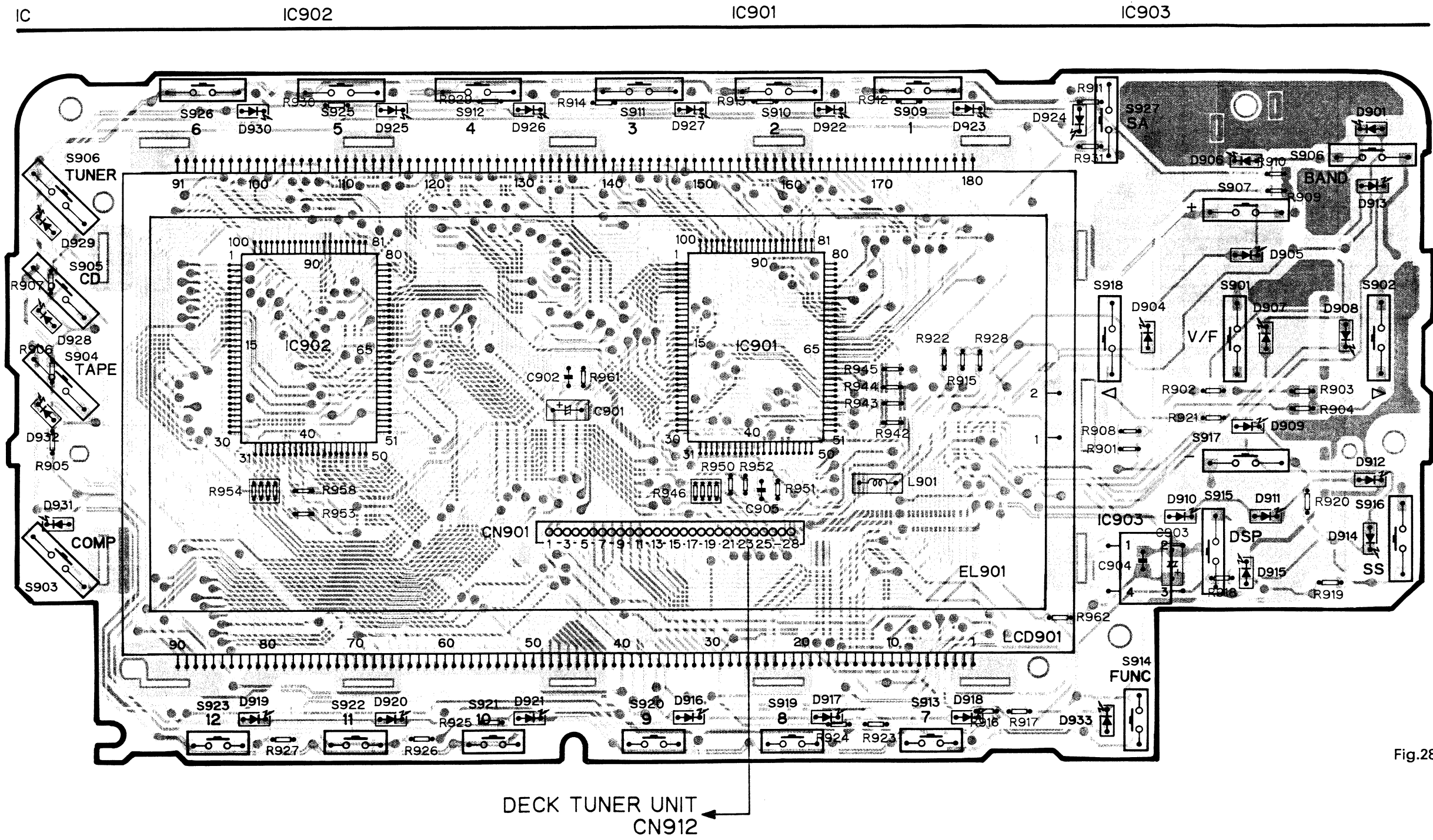


Fig.28

12.6 CASSETTE MECHANISM MODULE

● Circuit Diagram

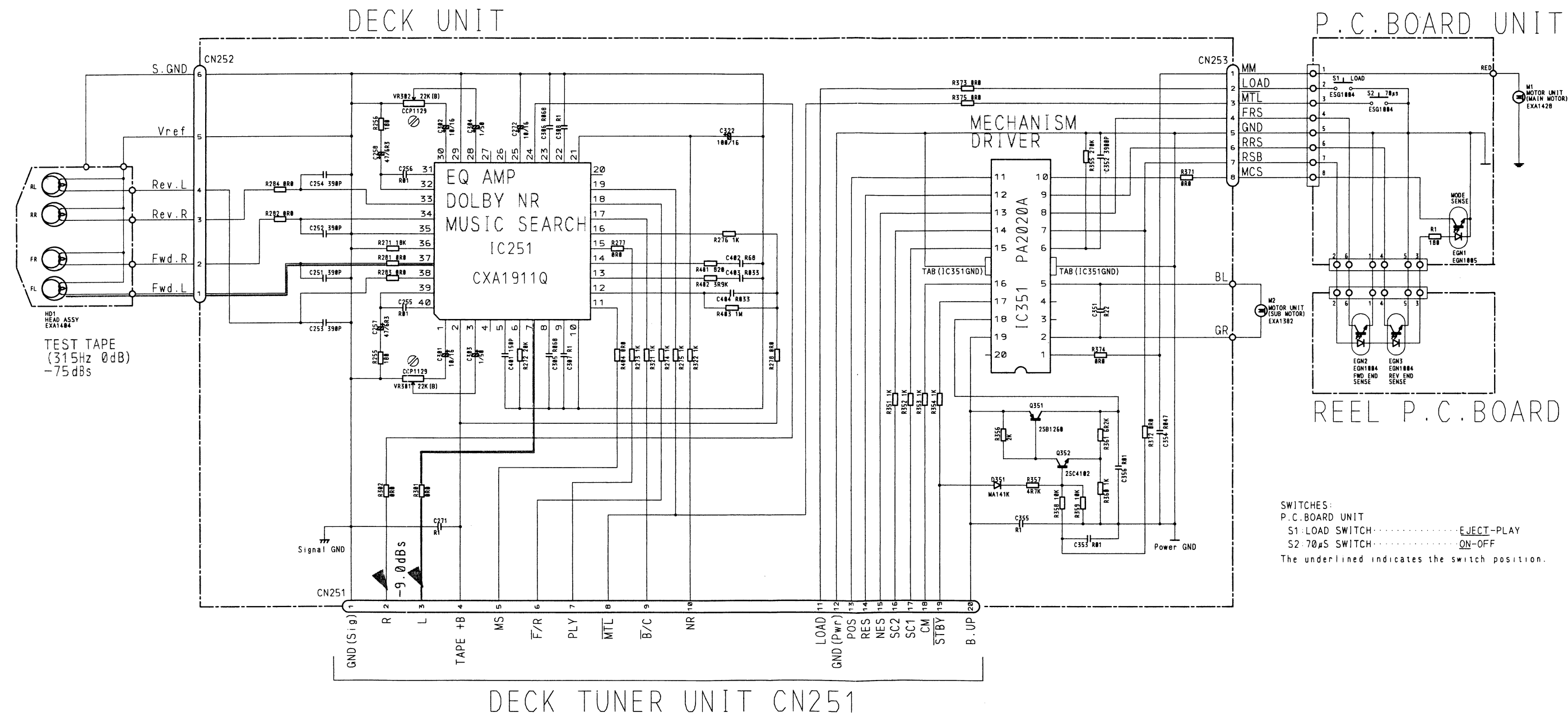
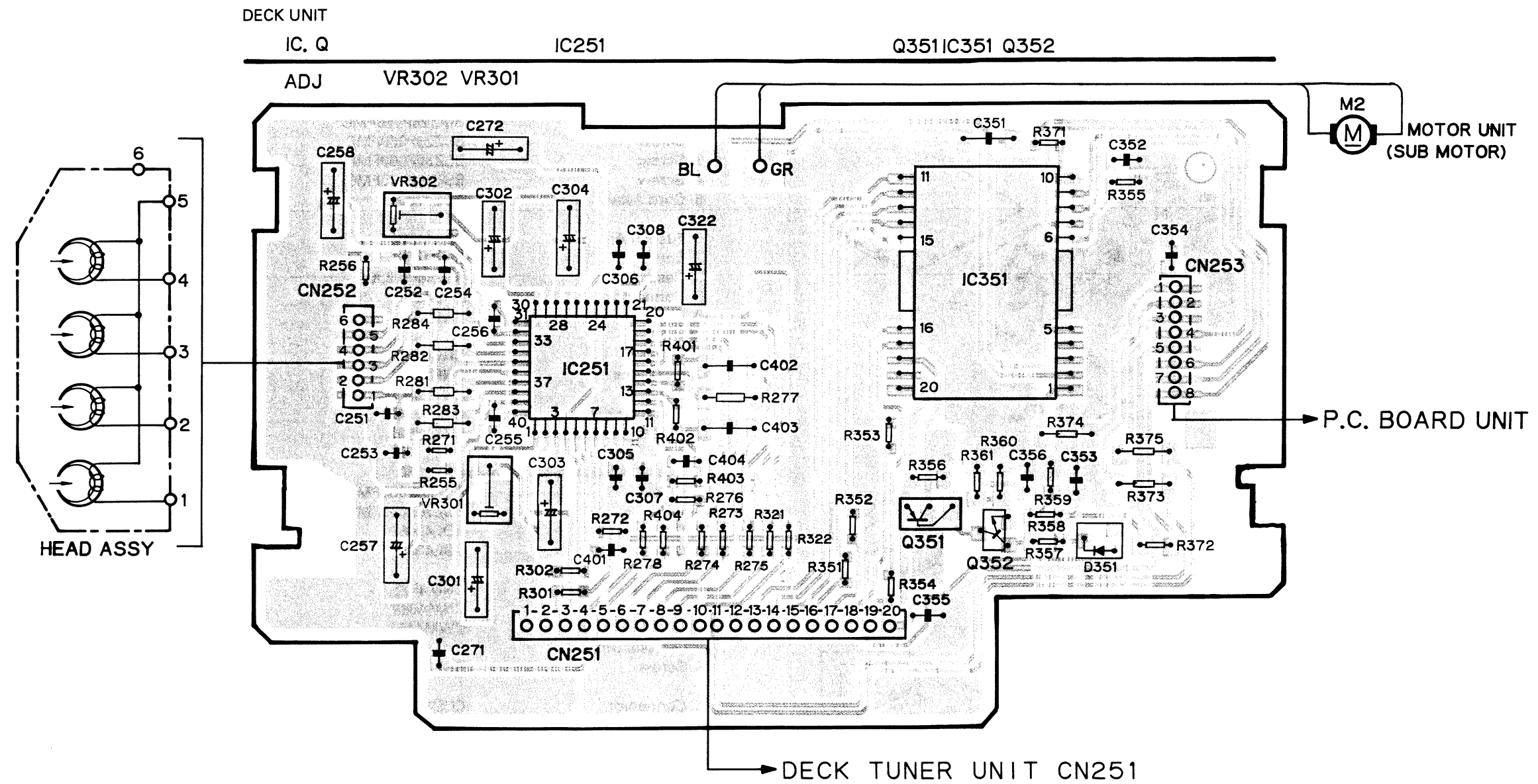
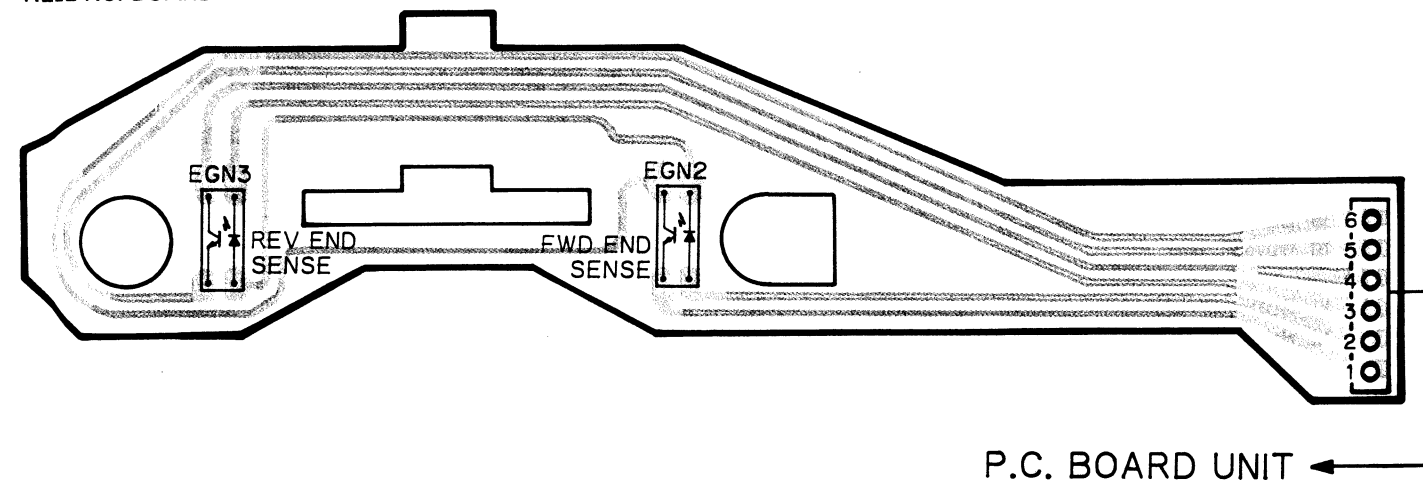


Fig.29

● Connection Diagram



REEL P.C. BOARD



P.C. BOARD UNIT

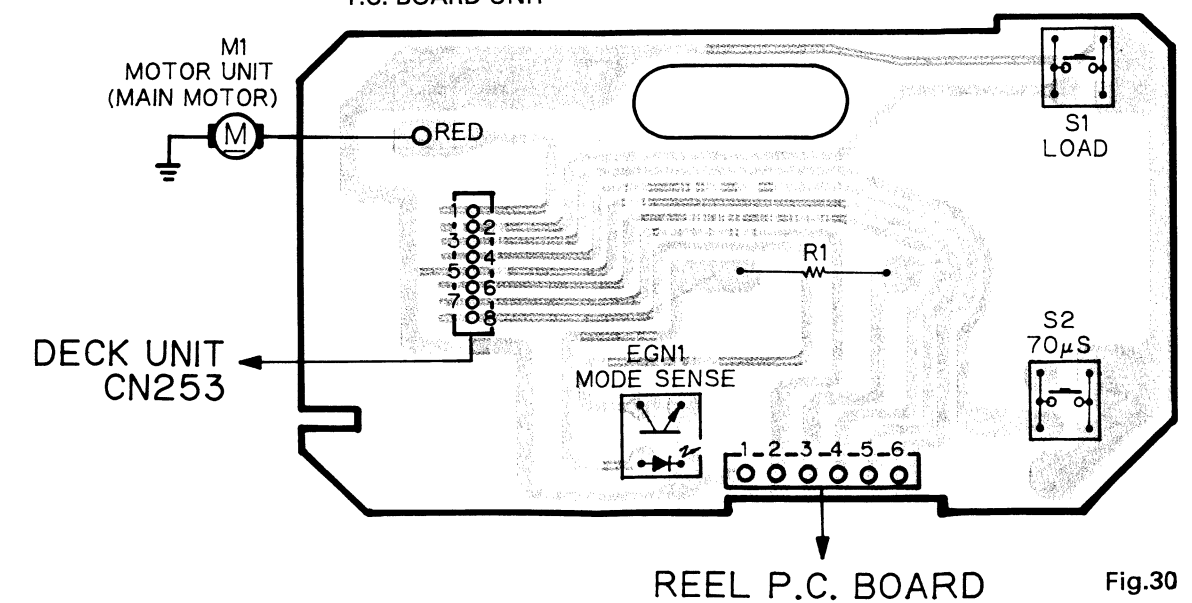
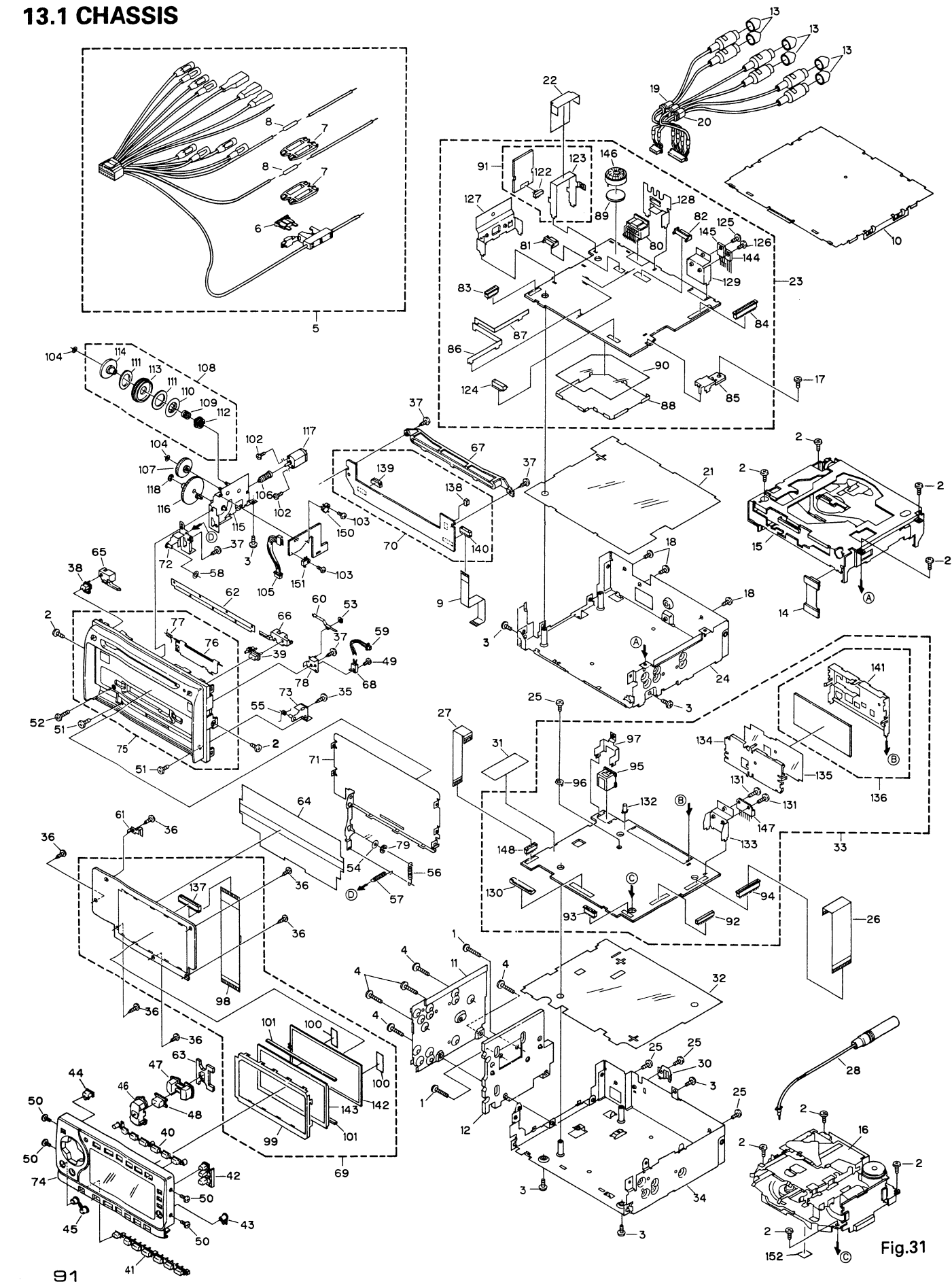


Fig.30

13. EXPLODED VIEW AND PARTS LIST

13.1 CHASSIS



NOTE:

● Parts marked by “*” are generally unavailable because they are not in our Master Spare Parts List.

● Parts List

Mark No	Description	Part No	Mark No	Description	Part No
1	Screw	BMZ26P160FMC	46	Button(+,-)	CAC4500
2	Screw	BSZ26P060FMC	47	Button(<,>)	CAC4501
3	Screw	BSZ30P060FMC	48	Button(V/F)	CAC4502
4	Screw	BSZ30P110FMC	49	Screw(M1.7x5.5)	CBA1070
5	Cord Assy	CDE4760	50	Screw(M2x3)	CBA1154
6	Fuse(10A)	CEK1136	51	Screw(M2x4)	CBA1172
7	Cap	CNS1472	52	Screw(M2x12)	CBA1348
8	Resistor	RS1/2P102JL	53	Washer	CBF-046
9	Connector	CDE4811	54	Washer	CBF1065
10	Case	CNB1991	55	Spring	CBH1817
11	Cover	CNC6162	56	Spring	CBH1856
12	Heat Sink	CNR1409	57	Spring	CBH1864
13	Cap	CNV2680	58	Spacer	CNV4594
14	Connector Unit	CXA6744	59	Connector	CDE4860
15	CD Mechanism Module	CXK2856	60	Arm	CNC1280
16	Cassette Mechanism Module	EXK3150	61	Conductor	CNC6365
17	Screw	BSZ26P080FMC	62	Cover	CNM4369
18	Screw	BSZ30P060FMC	63	Cushion	CNM4535
19	Cord	CDE4808	64	Insulator	CNM4536
20	Cord	CDE4809	65	Lens	CNV4392
21	Insulator	CNM4525	66	Lens	CNV4393
22	Insulator	CNM4689	67	Holder	CNV4394
23	DSP AMP Unit	CWM4451	68	Switch(S1)	CSN-088
24	Chassis Unit	CXA8219	69	Key Board Unit	CWM4454
25	Screw	BSZ30P060FMC	70	Switch Unit	CWM4455
26	Connector	CDE4239	71	Holder Unit	CXA8302
27	Connector	CDE4896	72	Bracket Unit	CXA8303
28	Antenna Cord	CDH1191	73	Bracket Unit	CXA8304
29	.....		74	Grille Unit	CXA8959
30	Holder	CNC4963	75	Grille Unit	CXA8635
31	Spacer	CNM4058	76	Door	CAT1734
32	Insulator	CNM4524	77	Spring	CBH1371
33	Deck Tuner Unit	CWM4465	78	Holder Unit	CXA8599
34	Chassis Unit	CXA8218	79	Washer	YE20FUC
35	Screw	BPZ20P050FZK	80	Plug(CN1801)	CKM1187
36	Screw	BPZ20P060FMC	81	Plug(CN1502)	CKS1238
37	Screw	BPZ20P080FMC	82	Plug(CN1501)	CKS1242
38	Button(CD-EJECT)	CAC4625	83	Connector(CN1401)	CKS2242
39	Button(OPEN/EJECT)	CAC4626	84	Connector(CN1701)	CKS2258
40	Button(1-6)	CAC4492	85	Holder	CNC5013
41	Button(7-12)	CAC4627	86	Holder	CNC5303
42	Button(TUNER,CD,TAPE)	CAC4494	87	Holder	CNC5450
43	Button(CMP)	CAC4495	88	Shield	CNC5451
44	Button(REL/BAND/F-R)	CAC4497	89	Insulator	CNM3634
45	Button(SS,DSP)	CAC4498	90	Insulator	CNM4063

MarkNo.	Description	Part No
91	Trans Unit	CWR1064
92	Connector(CN251)	CKS1730
93	Connector(CN913)	CKS2242
94	Connector(CN1020)	CKS2258
95	Connector(CN751)	CKS3408
96	Holder	CNC2218
97	Holder	CNC6350
98	Connector	CDE4983
99	Holder	CNC6177
100	Film	CNM4872
101	Connector	CNV4595
102	Screw(M2x3)	CBA1062
103	Screw(M1.7x5.5)	CBA1070
104	Washer	CBF1050
105	Connector	CDE4858
106	Gear	CNV2389
107	Gear	CNV3869
108	Gear Unit	CXA3406
109	Spring	CBH1337
* 110	Plate	CNC3240
* 111	Felt	CNM2638
112	Gear	CNV2459
113	Gear	CNV2460
* 114	Collar	CNV2478
115	Holder Unit	CXA8956
116	Gear Unit	CXA8748
117	Motor(M1)	CXM1085
118	Washer	YE20FUC
119-121	.....
122	Plug(CN1802)	CKS1614

MarkNo.	Description	Part No
123	Holder	CNC6288
124	Connector(CN1601)	CKS2302
125	Screw	BSZ30P060FMC
126	Screw	BSZ30P080FMC
127	Bracket	CNC6163
128	Holder	CNC6164
129	Holder	CNC6165
130	Connector(CN912)	KP100MB28L
131	Screw	BSZ30P060FMC
132	Mini Pin Jack(CN105)	CKX1046
133	Holder	CNC5291
134	Holder	CNC5529
135	Insulator	CNM4383
136	FM/AM Tuner Unit	CWE1365
137	Connector(CN901)	KP100MB28L
138	Connector(CN952)	CKS2191
139	Connector(CN954)	CKS2194
140	Connector(CN951)	KP100MC12L
141	Holder	CNC6523
142	EL(EL901)	CEL1441
143	LCD(LCD901)	CAW1326
144	Transistor(Q1812)	2SD1684
145	IC(IC1608)	L780S05
146	Choke Coil(L1801)	CTH1159
147	IC(IC701)	PA2024A
148	Connector(CN1010)	CKS2242
149	.....
150	Switch(S999)	CSN1022
151	Switch(S998)	CSN1022
152	Cushion	CNM4863

13.2 CASSETTE MECHANISM MODULE

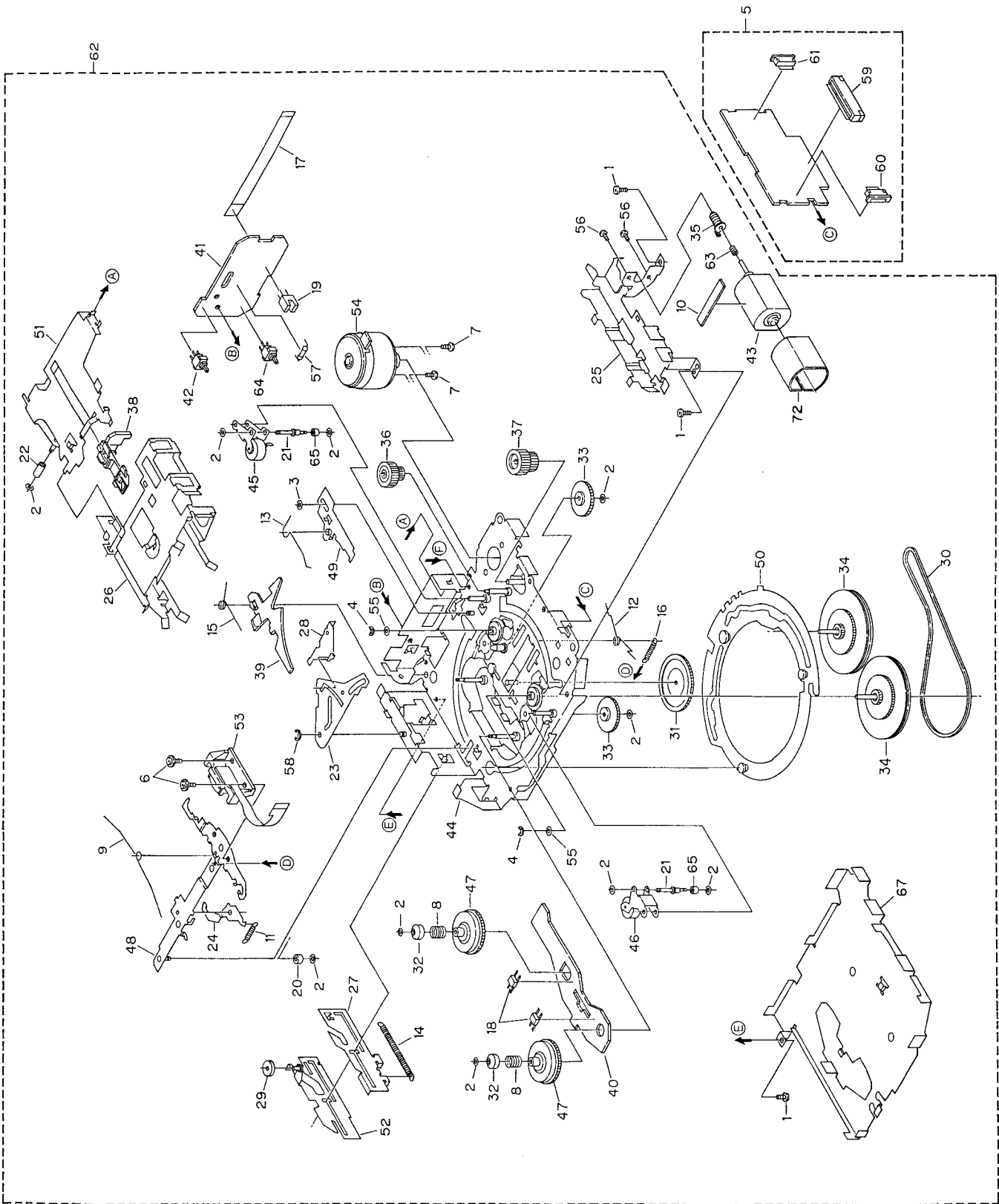


Fig.32

● Parts List

Mark No.	Description	Part No.
1	Screw	BSZ20P040FMC
2	Washer	CBF1037
3	Washer	CBF1038
4	Washer	CBG1003
5	Deck Unit	CWM4528
6	Screw	EBA1028
7	Screw	EBA1037
8	Spring	EBH1531
9	Spring	EBH1512
10	Cushion	ENM1034
11	Spring	EBH1515
12	Spring	EBH1516
13	Spring	EBH1517
14	Spring	EBH1518
15	Spring	EBH1519
16	Spring	EBH1537
17	Cord	EDD1015
18	Photo-reflector(EGN2,3)	EGN1004
19	Photo-interrupter(EGN1)	EGN1005
20	Roller	ENR1031
21	Shaft	ELA1362
22	Roller	ELA1348
23	Arm	ENC1396
24	Arm	ENC1397
25	Guide	ENC1398
26	Holder	ENC1417
27	Lever	ENC1418
28	Arm	ENC1401
29	Roller	ENR1027
30	Belt	ENT1027
31	Gear	ENV1347
32	Collar	ENV1349
33	Gear	ENV1350
34	Flywheel	ENV1410
35	Worm Gear	ENV1439

Mark No.	Description	Part No.
36	Worm Wheel	ENV1440
37	Gear	ENR1028
38	Lever	ENV1442
39	Arm	ENV1445
40	Gathering P.C.Board	ENX1029
41	Gathering P.C.Board	ENX1030
42	Switch(S1)	ESG1004
43	Motor Unit(M2)	EXA1382
44	Chassis Unit	EXA1435
45	Pinch Roller Unit	EXA1384
46	Pinch Roller Unit	EXA1385
47	Reel Unit	EXA1386
48	Head Base Unit	EXA1434
49	Lever Unit	EXA1438
50	Gear Unit	EXA1436
51	Frame Unit	EXA1390
52	Lever Unit	EXA1439
53	Head Assy(HD1)	EXA1404
54	Motor Unit(M1)	EXA1428
55	Washer	HBF-179
56	Screw	JGZ20P025FNI
57	Resistor(R1)	RD1/4HM181J
58	Washer	YE20FUC
59	Connector(CN251)	CKS1711
60	Connector(CN252)	CKS2127
61	Connector(CN253)	CKS2129
62	Spare Unit	EXA3013
63	Spring	EBH1545
64	Switch(S2)	ESG1004
65	Roller	ENR1023
66	.....
67	Cover	ENC1413
68-71	.....
72	Sheeld	ENC1410

13.3 CD MECHANISM MODULE

● Parts List

Mark No.	Description	Part No.
1	Screw	PMS26P040FMC
2	Control Unit	CWX1910
3	Connector(17P)(CN1001)	CKS1955
4	Connector(20P)(CN1701)	CKS2150
5	Connector(18P)(CN1002)	CKS2811
6	Connector(7P)(CN1801)	CKS2196
7	CD Mechanism Unit	CXA7200
8	Screw	BMZ20P030FMC
9	Screw	BSZ20P040FMC
10	Screw(M2x2)	CBA1250

Mark No.	Description	Part No.
11	Screw(M2x3)	CBA1077
12	Screw(M2x6)	CBA1231
13	Screw(M2x5)	CBA1291
14	Washer	CBF1038
15	Washer	CBF1060
16	Spring	CBH1413
17	Spring	CBH1417
18	Spring	CBH1418
19	Spring	CBH1748
20	Spring	CBH1428

Mark No.	Description	Part No.	Mark No.	Description	Part No.
21	Spring	CBH1457	66	Gear	CNV3569
22	Spring	CBH1552	67	Gear	CNV3570
23	Spring	CBH1553	68	Arm	CNV3571
24	Spring	CBH1554	69	Holder	CNV3572
25	Spring	CBH1665	70	Gear	CNV3573
26	Spring	CBH1556	71	Holder	CNV3574
27	Spring	CBH1789	72	Holder	CNV4067
28	Spring	CBH1558	73	Holder	CNV3576
29	Spring	CBH1664	74	Rack	CNV3577
30	Spring	CBH1560	75	Arm	CNV3578
31	Spring	CBH1576	76	Plate	CNV3629
32	Spring	CBH1577	77	Guide	CNV3694
33	Spring	CBH1666	78	Gathering P.C.Board	CNV2103
34	Spring	CBH1583	79	P.C.Board	CNP4230
35	Spring	CBH1628	80	Screw Unit	CXA2375
36	Spring	CBL1170	81	Motor Unit(M2)	CXA7150
37	Spring	CBL1171	82	Chassis Unit	CXA7196
38	Spring	CBL1200	83	Arm Unit	CXA5603
39	Connector	CDE4543	84	Arm Unit	CXA5604
40	PU Unit	CGY1031	85	Bracket Unit	CXA5605
41	Shaft	CLA2220	86	Lever Unit	CXA7197
42	Roller	CLA2255	87	Arm Unit	CXA5607
43	Shaft	CLA2256	88	Arm Unit	CXA5608
44	Frame	CNC5661	89	Gear Unit	CXA8809
45	Arm	CNC5565	90	Motor Unit(M1)	CXA7001
46	Lever	CNC4891	91	Bracket Unit	CXA5938
47	Lever	CNC4892	92	Frame Unit	CXA6192
48	Bracket	CNC4893	93	Motor Unit(M3)	CXA6456
49	Arm	CNC4895	94	Screw	JFZ17P035FNI
50	Arm	CNC5566	95	Screw	JFZ20P014FMC
51	Bracket	CNC5424	96	Screw	JFZ20P020FZK
52	Spacer	CNM3315	97	Screw	JFZ20P025FMC
53	Holder	CNV4018	98	Photo-transistor(P1,2)	PT4800
54	Sheet	CNM3693	99	Washer	YE15FUC
55	Bracket	CNM3917	100	Washer	YE20FUC
56	Belt	CNT1053	101	Screw	JGZ20P020FZK
57	Clamper Unit	CXA6999	102	Sheet	CNM4028
58	Guide	CNV2891	103	Spring	CBH1710
59	Holder	CNV3276	104	Spacer	CNC5436
* 60	Roller	CNV3412	105	Screw	JFZ20P045FMC
61	Damper	CNV3974	106	Washer	CBF1061
62	Arm	CNV3565	107	Screw	JGZ17P025FZK
63	Arm	CNV3992	108	.....
64	Gear	CNV3567	109	Cushion	CXX1136
65	Gear	CNV3568			

13.4 REMOTE CONTROL ASSY

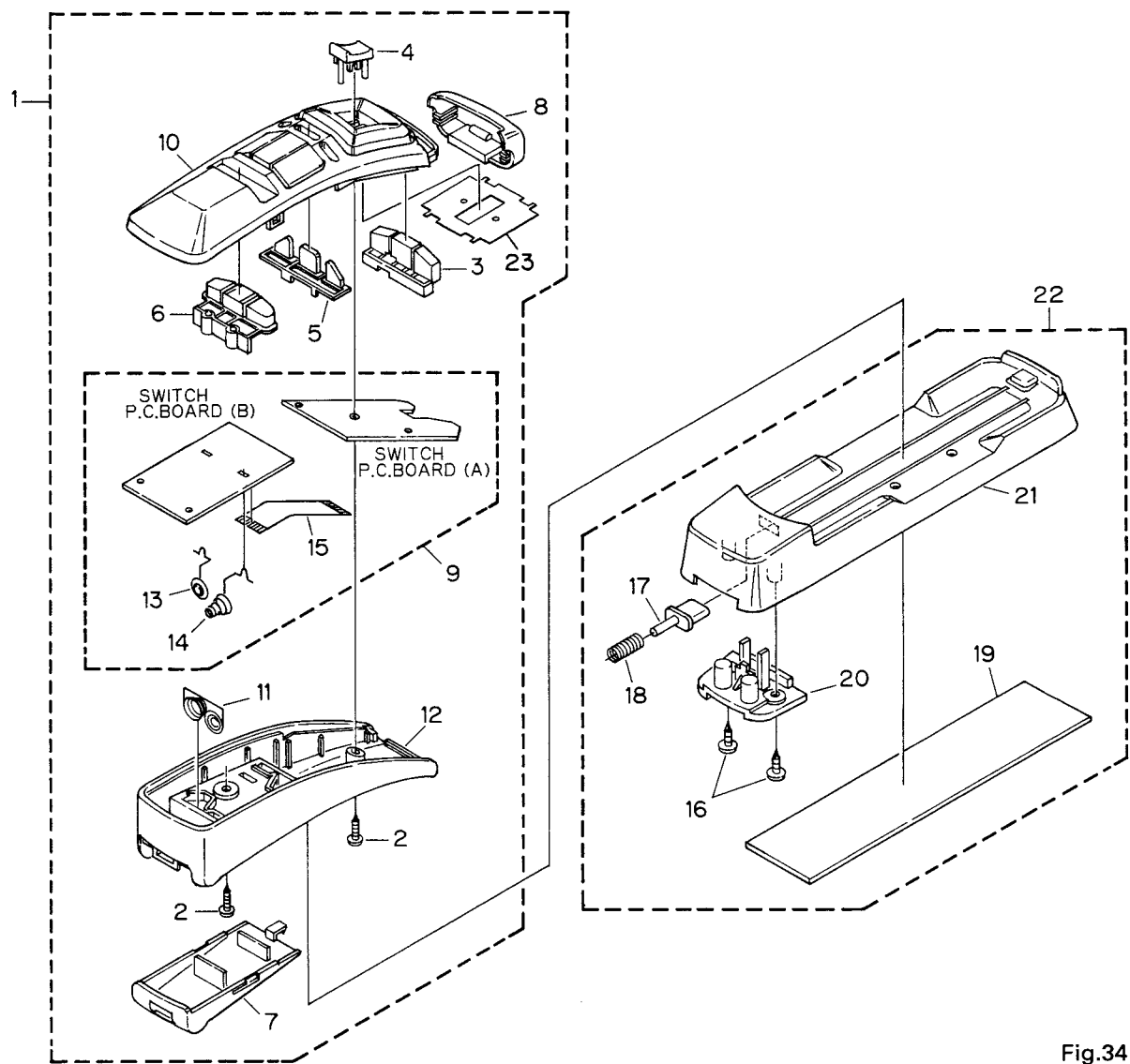


Fig.34

● Parts List

Mark No.	Description	Part No.
1	Remote Control Assy	CXA8589
2	Screw	BPZ20P080FZK
3	Button	CAC4567
4	Button(VOL+-)	CAC4568
5	Button	CAC4453
6	Button	CAC4569
7	Cover	CNS3798
8	Filter	CNS4023
9	Remote Control Unit	CNM4651
10	Grille Unit	CXA8590

Mark No.	Description	Part No.
11	Spring	CBH1796
12	Cover	CNS3797
13	Spring	CBH1716
14	Spring	CBH1717
15	Connector	CDE4759
16	Screw	BPZ30P080FZK
17	Button	CAC4140
18	Spring	CBH1711
19	Sheet	CNM3718
20	Cover	CNS3240
21	Grille	CNS3239
22	Base Assy	CXA7617
23	Sheet	CNM4864

14. PACKING METHOD

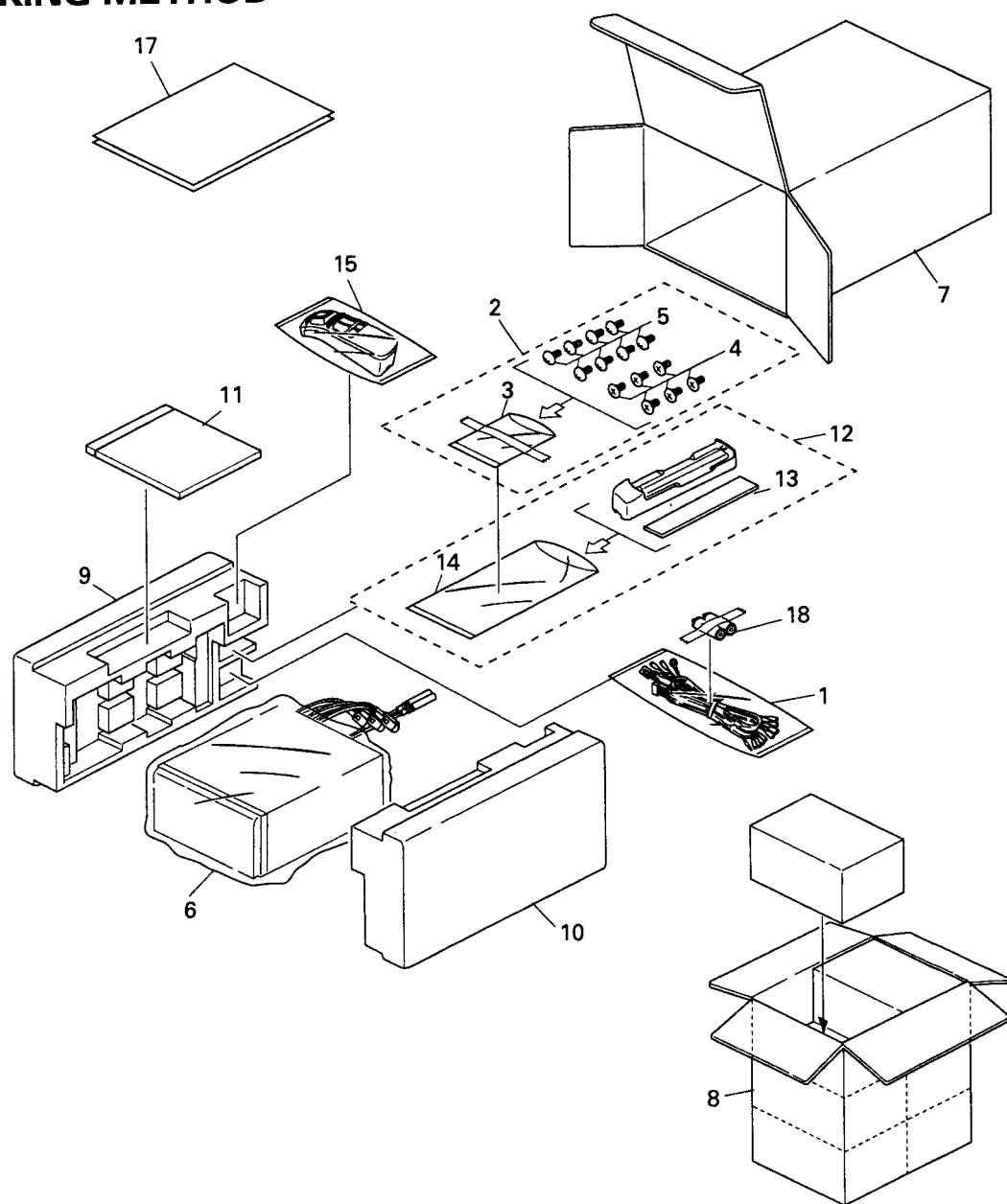


Fig.35

● Parts List

Mark No.	Description	Part No.
1	Cord Assy	CDE4760
2	Accessory Assy	CEA1991
* 3	Polyethylene Sheet	CNM4338
4	Screw	CRZ50P090FMC
5	Screw	TRZ50P080FMC
6	Cover	CEG1074
7	Carton	CHG2829
8	Contain Box	CHL2829
9	Protector(L)	CHP1755
10	Protector(R)	CHP1756

Mark No.	Description	Part No.
11	CD	CPJ1004
12	Base Assy	CXA7617
13	Sheet	CNM3718
14	Polyethylene Bag	CEG1011
15	Remote Control Assy	CXA8589
15-1	Polyethylene Bag	CEG1011
16	Battery	CEX1006
17-1	Owner's Manual (English)	CRB1366
17-2	Owner's Manual (Spanish)	CRB1373

Service Manual

ORDER NO.
CRT1574

CD MECHANISM MODULE

CX-540

- This service manual describes operation of the CD mechanism incorporated in models listed in the table below.
- When performing repairs use this manual together with the specific manual for model under repair.

Model	Service Manual	CD Mechanism Module	CD Mechanism Unit
DEH-605RDS/EW,X1B/EW	CRT1563	CXK2810	CXA6475
DEH-505SDK/GR			
DEH-505/EW,X1B/EW			
DEH-405SDK/GR			
DEH-505/UC	CRT1570	CXK2800	CXA5970
DEH-503/ES			
DEH-45/UC			
DEH-405/UC			
DEH-305/US			
DEH-303/ES			
DEH-205/UC			
DEH-203/ES			

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3. DISASSEMBLY	19

1. CIRCUIT DESCRIPTION

1.1 PRE-AMPLIFIER STAGE (IC1001 UPC2571GS)

The optical signals are converted to voltage signals using an i/v amplifier inside the PU unit.

These voltage signals (A - F) are further processed by this pre-amp stage.

The pre-amplifier performs the following tasks

- > Automatic power control of the PU unit's laser diode.
- > Generation of an equalized RF signal from the photo-detector outputs (A - D).
- > Generation of a focus error signal from the photo-detector outputs (A - D).
- > Generation of a tracking error signal from the photo-detector outputs (E & F).
- > Generation of a tracking zero crossing signal from the photo-detector outputs (E & F).

This IC runs from a single voltage supply (+5V). The reference voltage for this IC, the PU unit, and all the servo circuitry is REFO. This is obtained from pin 19 of the pre-amp ; which in turn is derived from the output REFOUT of the servo LSI, IC1201, UPD63700GF. The voltages REFOUT and REFO should be at +2.5V DC with respect to GND. All measurements and observations should be made using REFO as the reference as this is a buffered output. Care should be taken not to inadvertently short REFO to GND.

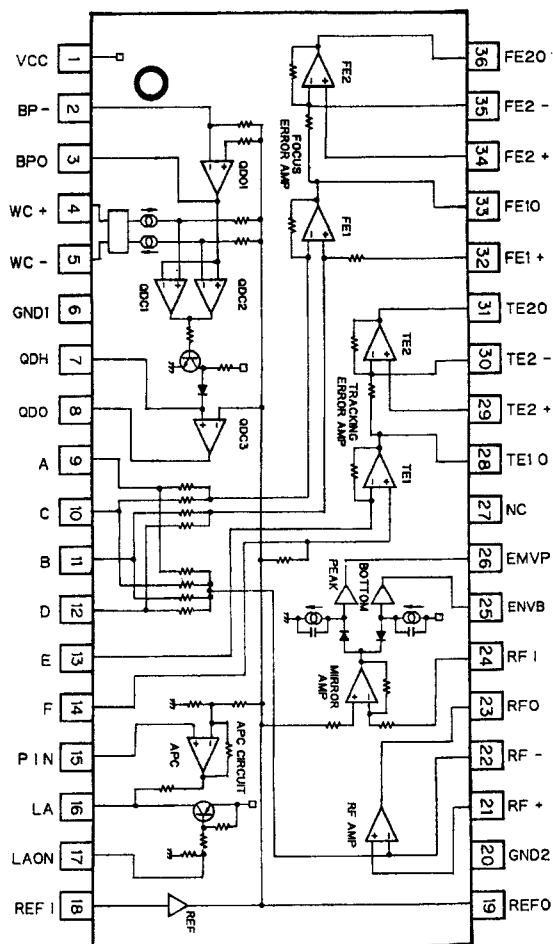


Fig.1 : UPC2571GS BLOCK DIAGRAM

1) Automatic Power Control (APC)

The laser diode's junction voltage varies greatly with temperature ; causing large output variations in optical power. To avoid this, a monitor diode is used in a feedback circuit to keep the optical power constant. As two different manufacturer's laser diodes are used the LD current falls into two broad bands : approx. 40mA and approx. 60mA.

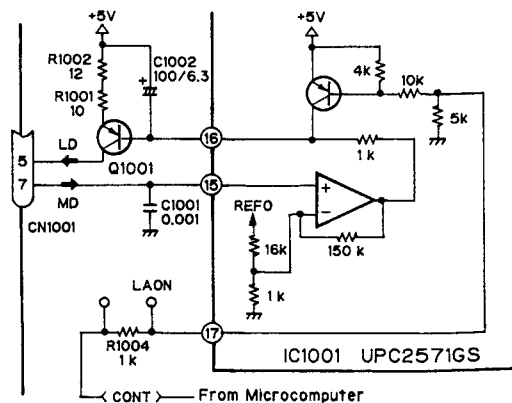


Fig.2 : APC CIRCUIT

2) RF Amplifier

This performs a simple summation of the photo-detector outputs A,B,C & D, amplifies, and equalizes to produce the RF signal at RFO. The RF eye pattern may be monitored here. The RFO OFFSET volume is used to ensure that the RFO waveform has the correct offset relative to the FOK threshold level inside the servo LSI UPD63700GF. The FOK signal is used in the focus close sequence, and during play to control the defect circuit inside the UPD63700GF.

The AC coupled RFO signal, RFI, is used by the UPD63700GF to generate the EFM signal which is used in turn by the DSP spindle CLV control sections.

For low frequency signals :

$$VRFO = (A+B+C+D) \times (R1018+R1019)/10k = (A+B+C+D) \times 6.22$$

The RFO waveform should have an amplitude of approx. 1.9Vpp, with it's upper envelope at +1.1V DC w.r.t. REFO.

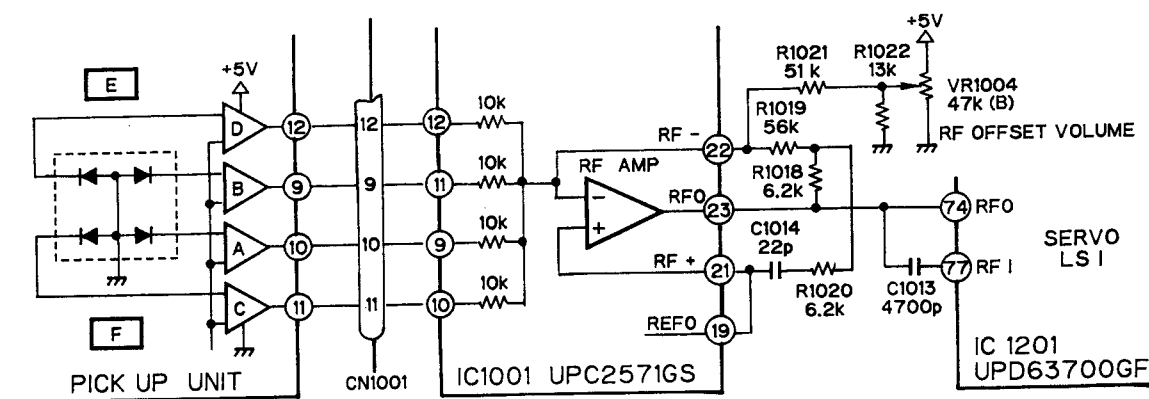


Fig.3 : RFO AMPLIFIER

3) Focus Error Amplifier

This produces a focus error signal used as the basis for the focus servo.

$$VFEY = (A+C)-(B+D) \times 5 \times (R1007//20k)/10k \\ = FE \times 6.23 \text{ (FE = PU unit focus error)}$$

The S-Curve at FEY should have an amplitude of approx. 1.9Vpp.

The second amplifier stage is also a low pass filter, $f_c=11\text{kHz}$, and has a bias volume adjustment. This adjustment is used to vary the reference bias level of the focus servo loop and is adjusted to obtain an optimum eye pattern at RFO.

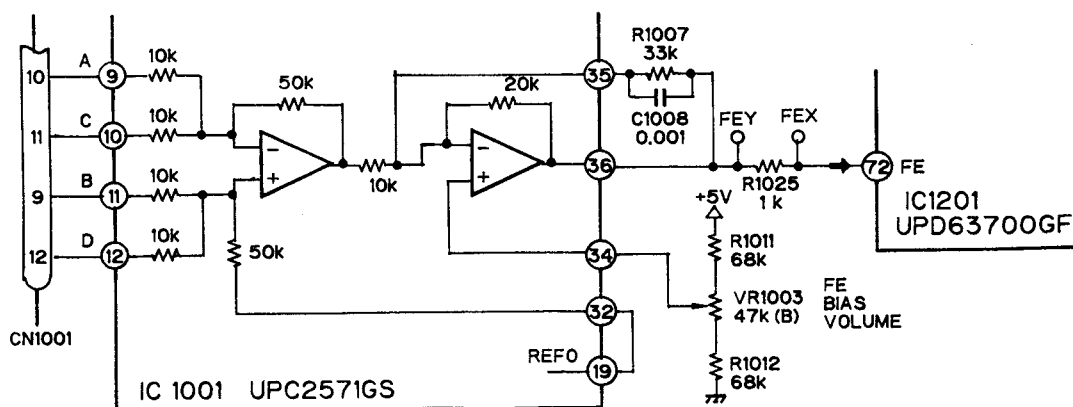


Fig.4 : FOCUS ERROR AMPLIFIER

1.2 SERVO STAGE (UPD63700GF)

All the servo equalization & sequencing, such as focus closing, track jumping, carriage moving etc. are performed in this LSI, as well as all the DSP functions : data decoding, error protection, interpolation etc. The signals FE & TE are digitized and processed by the servo block to produce the focus, tracking & carriage drive signals, in a PWM format.

The RFI signal is converted to the EFM signal which is decoded by the DSP block to produce an audio signal ; during this process, a spindle servo error signal is also generated and used by the servo block to produce a spindle drive signal, again in PWM form.

The PWM waveforms are filtered, to remove the PWM carrier, amplified by the driver IC1301 PA3026, and output to the corresponding actuators.

1) Focus Servo System

The main focus equalization takes place inside the UPD63700GF (figure 7). The equalizer response can be measured between FEX and FIN and has the shape shown in figure 8.

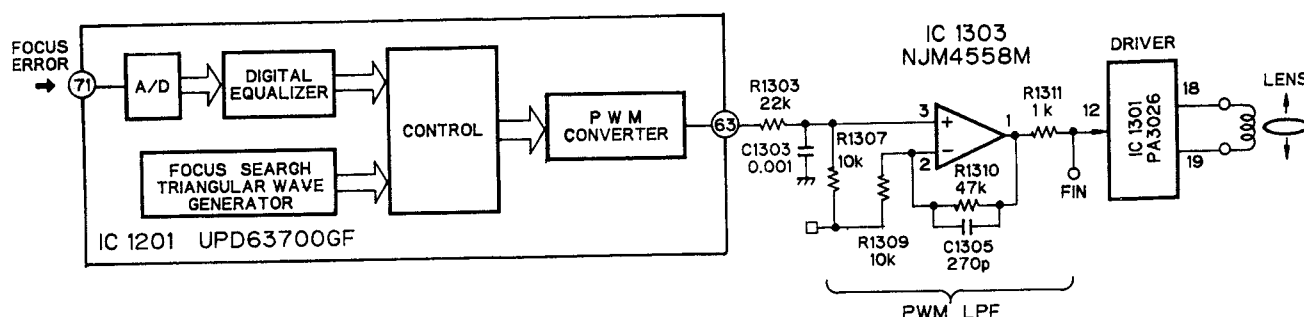


Fig.7 : FOCUS SERVO BLOCK DIAGRAM

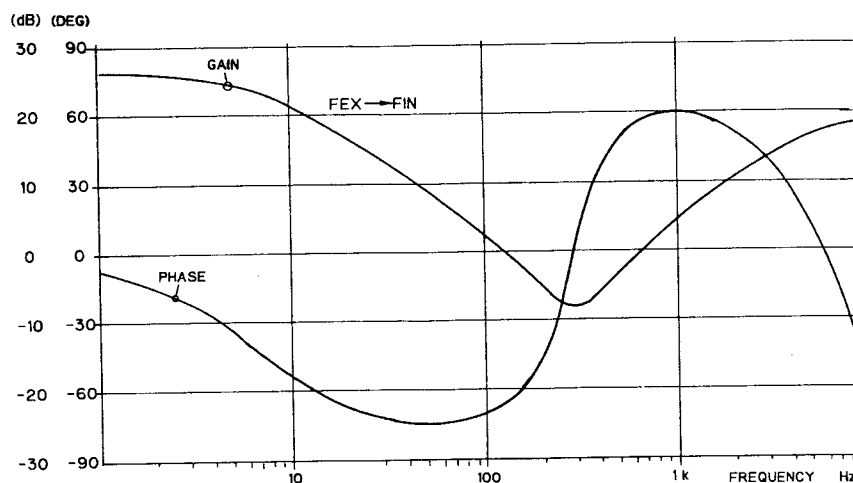


Fig.8 : FOCUS EQUALIZER

In order to smoothly close focus the lens must first be within approx. $5\mu\text{m}$ of the "just focused" position. This position is achieved by a focus search sequence. The lens is moved up and down using a triangular wave search voltage while the spindle motor is kicked and kept rotating at an appropriate speed. The servo LSI monitors the FE and RFO signals and, at an appropriate point, automatically closes focus.

The conditions for focus close are :

- 1) The lens is moving from a far to a near position relative to the disc,
- 2) FOK = HIGH (5V),
- 3) FZD (IC internal signal) was latched high and
- 4) FE = 0 (w.r.t. REFO).

When the focus servo closes, the servo LSI's serial data

output port, XSO, will show a high-low transition. This is received by the microcomputer as an indication that the servo loop was closed and after about 25mS it begins monitoring the FOK output, via a LPF, to verify that focus is still closed ; in the event of FOK becoming low for an appreciable time, the microcomputer will take appropriate action.

The various signal levels which contribute to focus close are shown in figure 9, which shows the case where focus close has been inhibited.

In TEST MODE, using FOCUS CLOSE MODE 1, conditions 2 & 3 can be inhibited to allow the S-Curve, focus search voltage and the actual lens movement to be observed at ease.

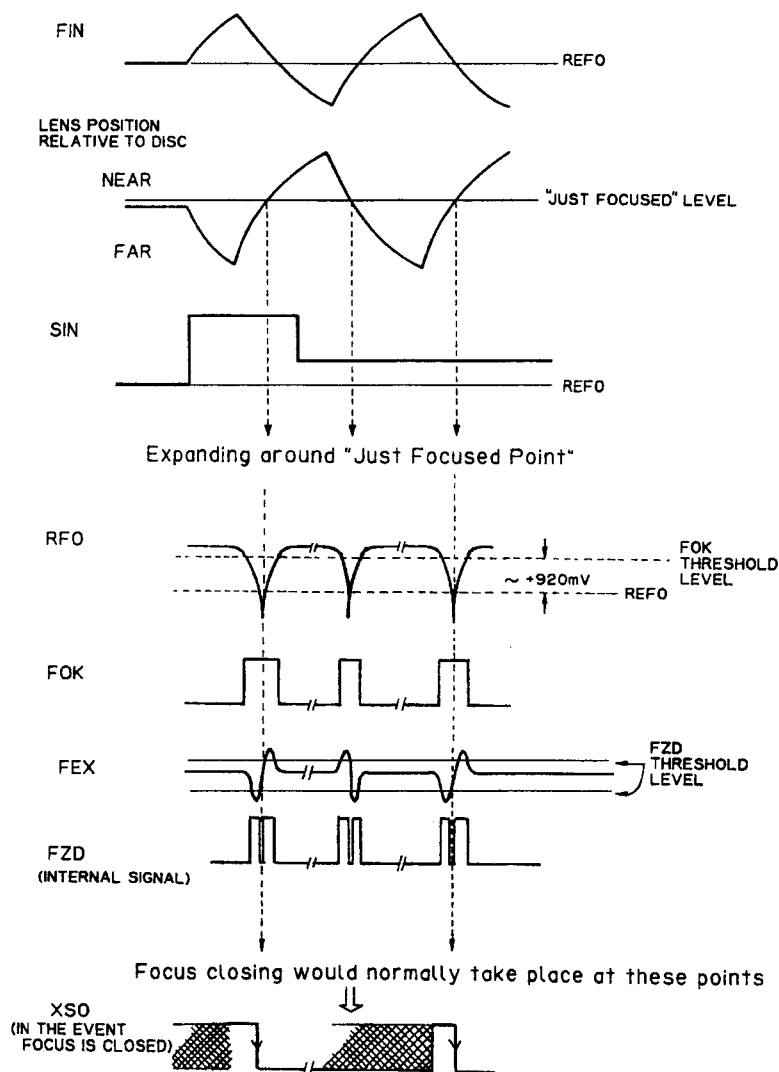


Fig.9 : FOCUS CLOSING SEQUENCE

a) FOK CIRCUIT

The FOK circuit inside the servo LSI compares the lower envelope of the RFO signal with a threshold level fixed by the microcomputer. Should the envelope level fall below this FOK level then FOK becomes high. This is used during focus close as stated and also during play to control a defect circuit, which switches the focus &

tracking servos into a hold mode should the RFO envelope become disrupted by dirt, grease etc, thus increasing the player's defect response (figure 10). The FOK threshold is approx. +920mV w.r.t. REFO. It is for this reason that the upper envelope should be adjusted to +1.1V DC w.r.t. REFO.

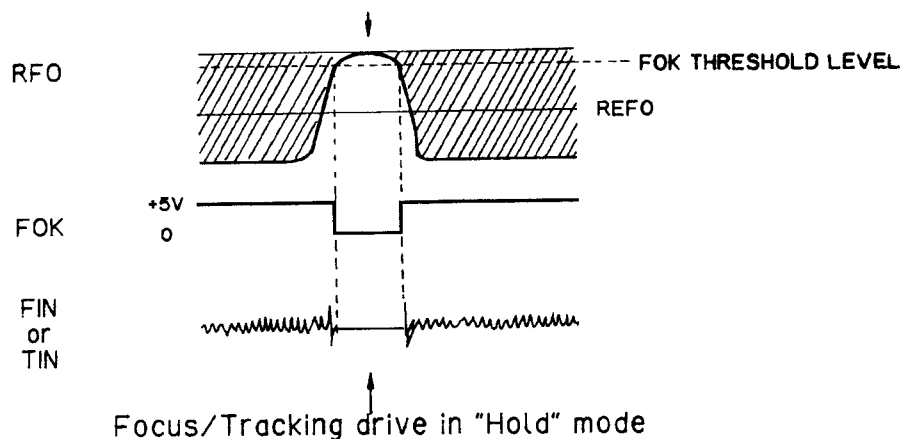


Fig.10 : DEFECT CIRCUIT

b) FZD CIRCUIT

The FZD circuit inside the servo IC compares the absolute value of the FE signal to a threshold value and outputs a high/low signal which is then used in the focus close sequence as stated.

At power on, the microcomputer switches the laser diode off and reads the value of the FE bias via the servo LSI's A/D port. The FZD threshold is set 200mV above this bias level.

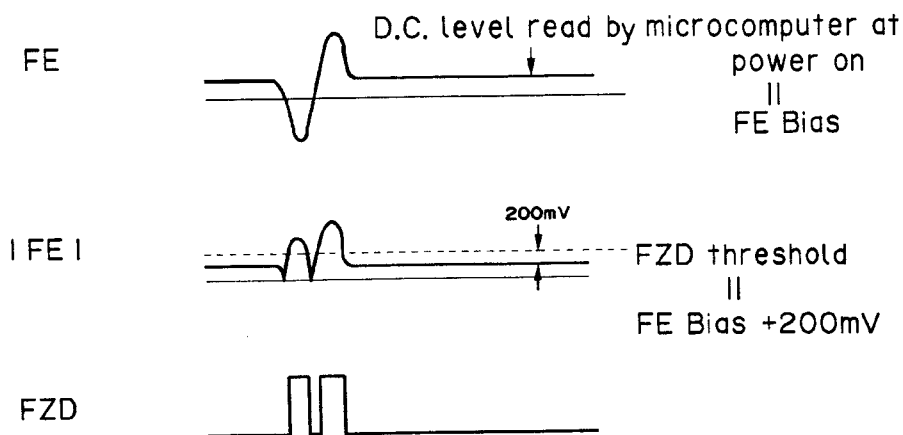


Fig.11 : FZD CIRCUIT

2) Tracking Servo System

The main tracking equalization takes place inside the UPD63700GF (figure 12). The equalizer response can be measured between TEX and TIN and will have the shape shown in figure 13.

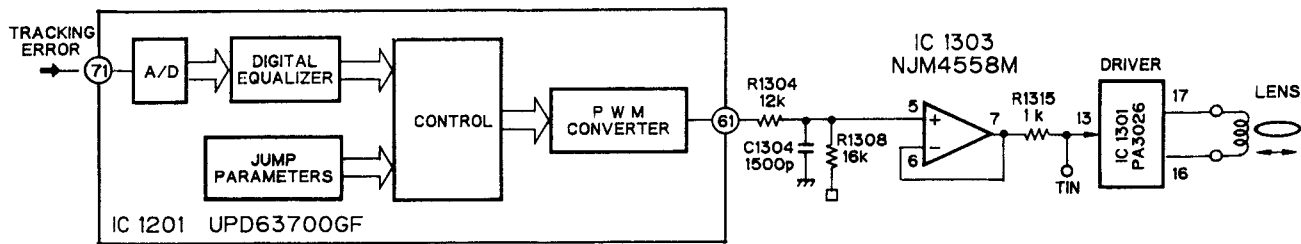


Fig.12 : TRACKING SERVO BLOCK DIAGRAM

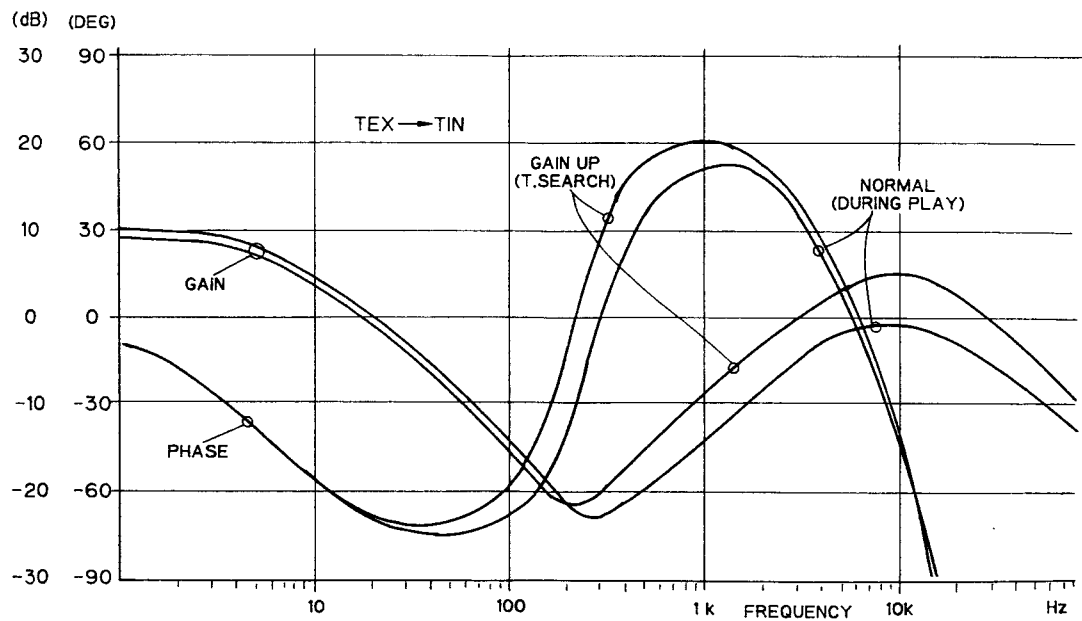


Fig.13 : TRACKING EQUALIZER

a) Track Jumping

Track jumping is performed automatically by the servo LSI upon receipt of the appropriate command from the microcomputer. The present microcomputer is programmed to use 1,4,10 & 32 track jump commands to achieve searching. The 32 track jump command may be used in pairs (64 tracks) or triplets (100 track) as required. In TEST MODE the 1,4,10,32 & 100 track jump and carriage move sequences may be observed by selecting the appropriate mode.

Note that the number of tracks jumped is controlled by setting an internal counter to half the total value and then counting this down using the zero crossing edges of TEC1. Once the counter is at zero, a brake pulse of

fixed duration is output to bring the lens to a halt; allowing tracking to be closed and normal play to continue.

For a fixed period of time after a multi-track jump has been performed, a "tracking brake" circuit is activated in conjunction with a "gain-up" equalizer to ensure that the servo achieves stabilization before entering normal play.

Manual track search, in normal mode, uses a group of single track jumps to achieve FWD/REV at approx. ten times normal play speed.

The figures 14 & 15 show the timing charts for the single and multiple jump commands.

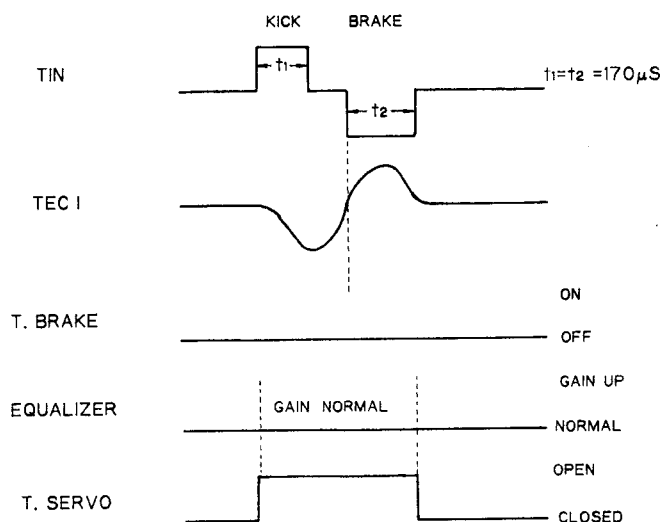


Fig.14 : SINGLE TRACK JUMP

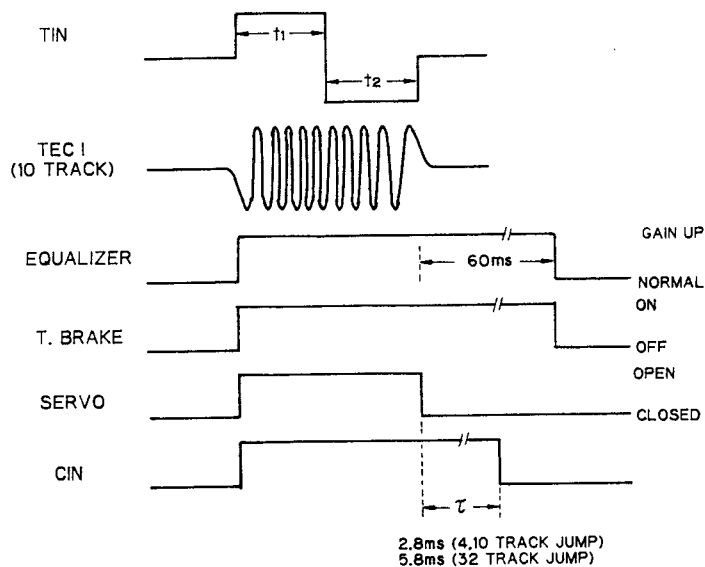
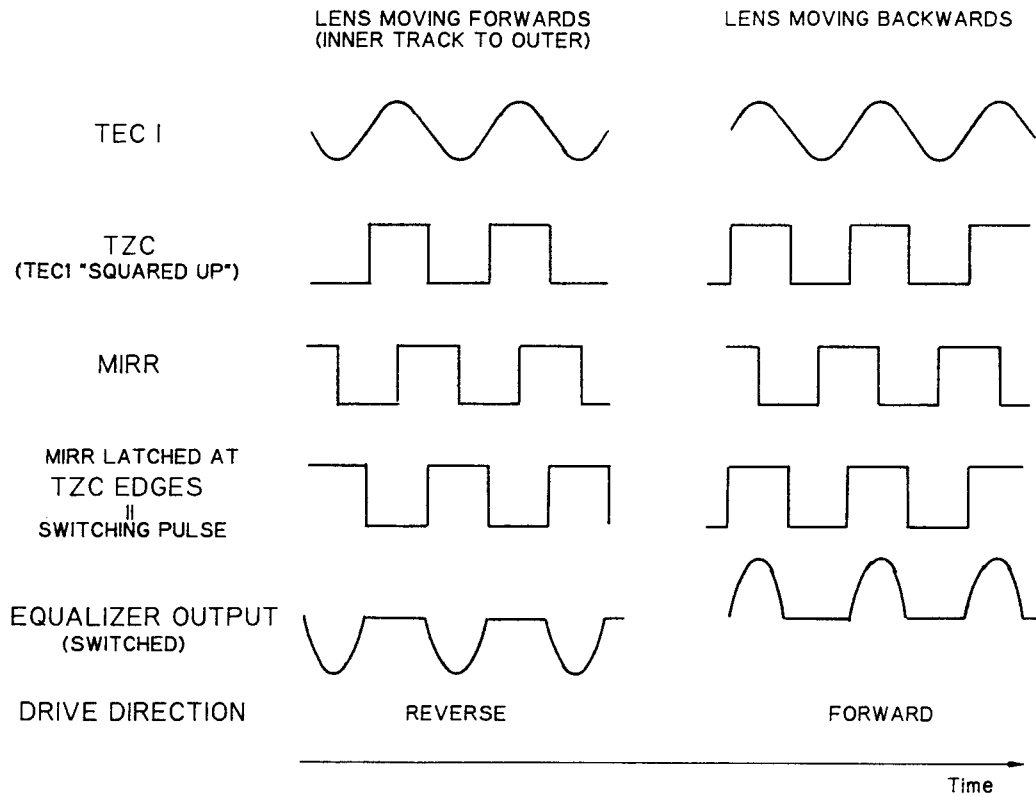


Fig.15 : MULTI TRACK JUMP

b) Tracking Brake Circuit (Figure 16)

This relies on determining which direction the lens is moving and only outputting the portion of the drive waveform which acts to oppose this motion. Direction

of motion is deduced from TEC1 and the MIRR signal and knowledge of their phase relation.



Note : Equalizer output assumed to have same phase as TEC1.

Fig.16 : TRACKING BRAKE CIRCUIT

c) MIRROR Circuit

The MIRR circuit indicates if the laser beam is on or off track.

MIRR = 'H' => off track, MIRR = 'L' => on track.

MIRR is generated by detecting the upper and lower envelopes of the RFO waveform and producing a difference signal which is then compared with a peak-held version of itself to determine if the envelope size has dropped below a certain percentage.

If so, this is assumed to be due to the beam going off-track ; in practice dirt on the disc can also give the same effect (see figure 17).

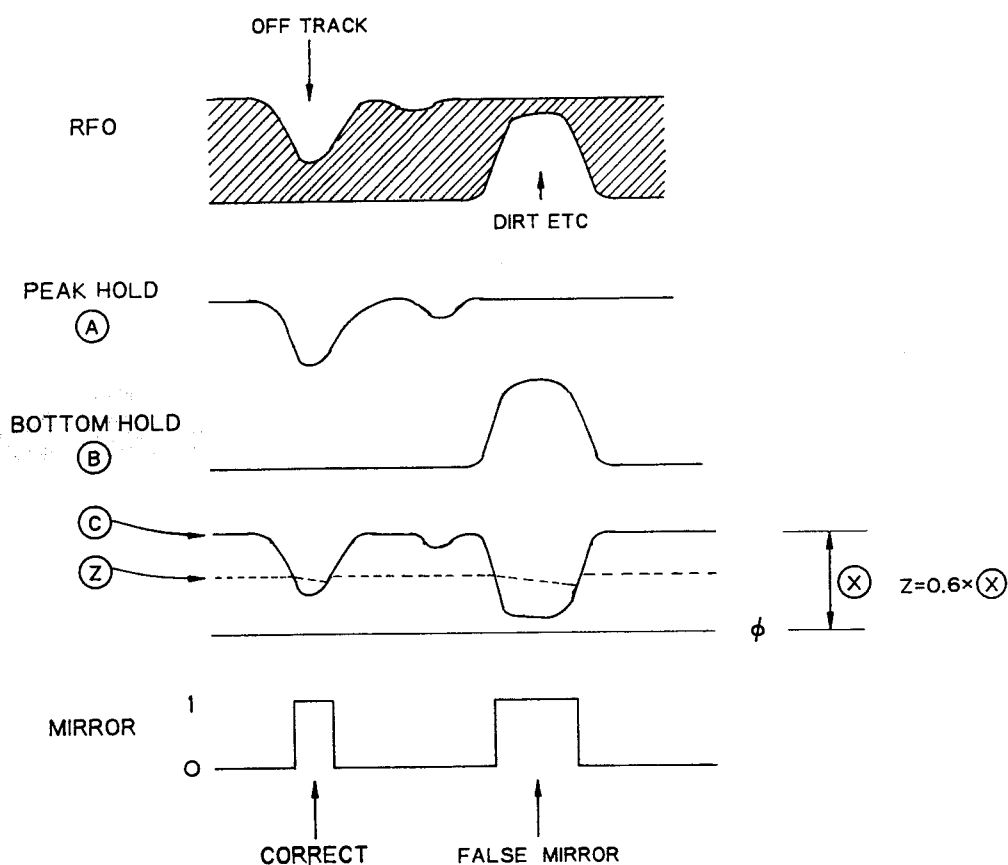
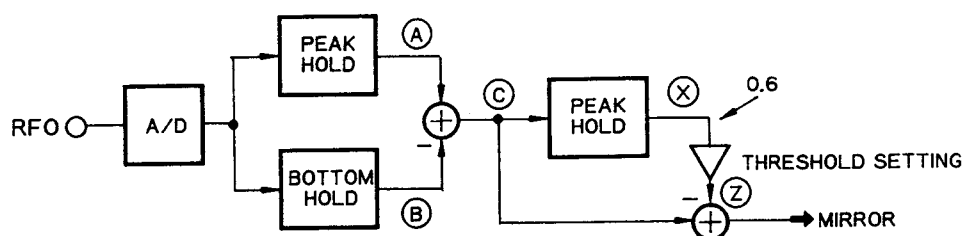


Fig.17 : MIRROR CIRCUIT & SIGNAL DIAGRAM

3) Carriage Servo System

The carriage servo system takes its input from the low frequency component of the tracking equalizer output. This is amplified and equalized, and the output fed to the carriage motor via the PWM converter, LPF and driver IC. The gain of the equalizer is set so that when the lens is offset from its center by a set amount the voltage at the carriage motor is enough to overcome friction and move the carriage forward.

Because the carriage motor will only begin moving when the applied voltage is great enough to overcome friction the drive voltage is cut-off inside the servo LSI until it reaches an appropriate level ; thus saving on wasted power dissipation.

Due to eccentricity of the disc etc. the threshold level may be crossed several times before the carriage assembly actually moves. This can result in a series of pulses being applied to the carriage motor.

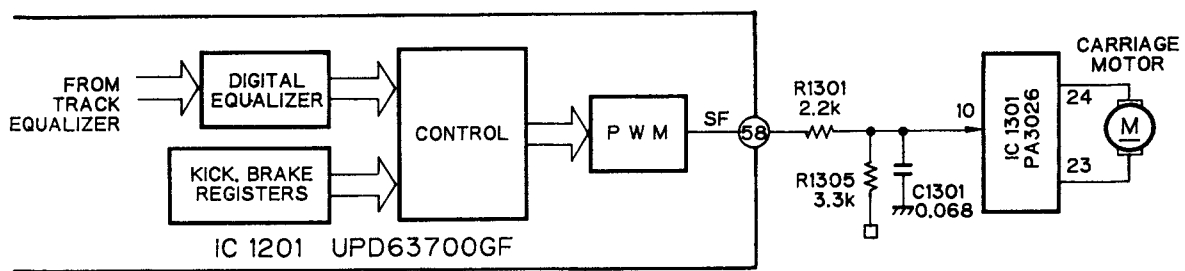


Fig.18 : CARRIAGE SERVO CIRCUIT

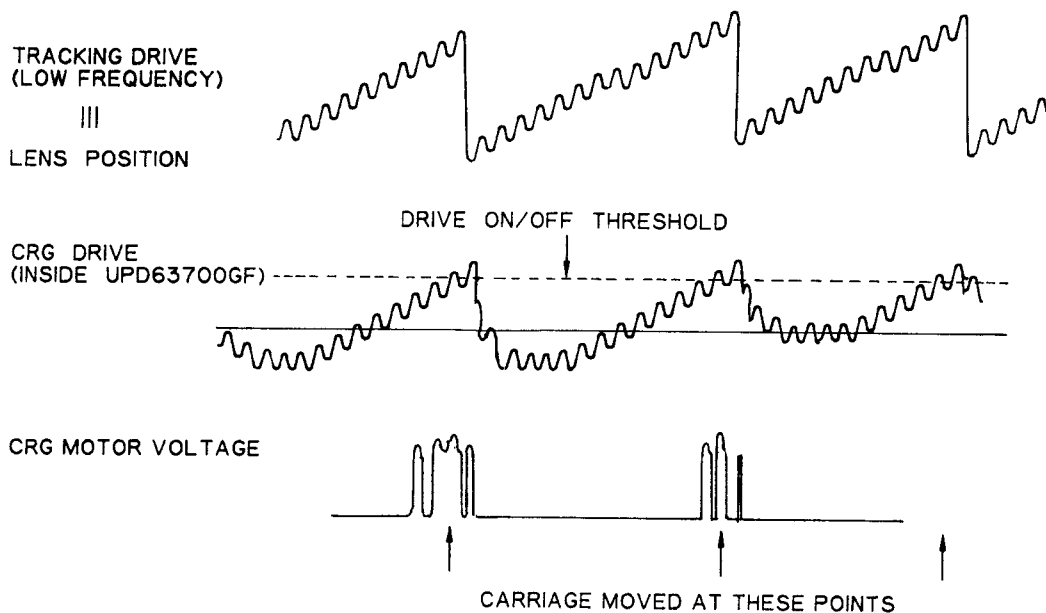


Fig.19 : CARRIAGE WAVEFORM

4) Spindle Servo

The spindle servo has a number of different modes :

- (i) Kick : Used at set-up to bring the spindle up to speed from stand-still.
- (ii) Offset : This is used i) At set-up, after spindle kick and before AGC has finished.
ii) During play if focus is suddenly disrupted.
- (iii) Adaptive Servo : This is the CLV mode which ensures that the linear velocity of the disc as seen by the laser spot is kept constant. During play, a timing signal is extracted from the EFM signal and used to generate speed and phase error signals. These error signals are summed and fed into a servo equalizer to produce a drive signal via the PWM converter.
- (iv) Brake : This is used to bring the disc to a stop quickly, for ejection or when CD source is de-selected or for any other reason. The servo LSI puts out a brake level and monitors the EFM signal. When the longest pattern in the EFM signal is longer than a fixed amount an internal flag is set. By monitoring this flag the microcomputer can judge when the disc has stopped and proceed to eject etc. If this flag is not set within a certain time limit the servo is switched to STOP mode and eject is implemented after a wait period.

- (v) Stop : This occurs at power on or during disc eject. The spindle motor voltage is zero.
- (vi) Rough : This is used in normal mode to control the linear velocity of the disc when the carriage is being moved for fast access. A speed signal is deduced from the EFM waveform and input to the spindle equalizer. This mode should be used in TEST MODE to perform the grating adjustment.

a) EFM Comparator

This circuit 'squares' up the analog RF signal into a digital EFM signal. In order to ensure minimum errors it is necessary to use a feedback circuit to match the DC level of the threshold to the center of the RF waveform. This circuit (shown in the spindle servo block diagram) uses the fact that the EFM signal should have no DC component. By feeding back the EFM signal's DC level the threshold level changes until the DC level is zero and the threshold, by definition, is at the exact center of the RFI waveform. The filtering in the feedback has been adjusted to ensure minimum error.

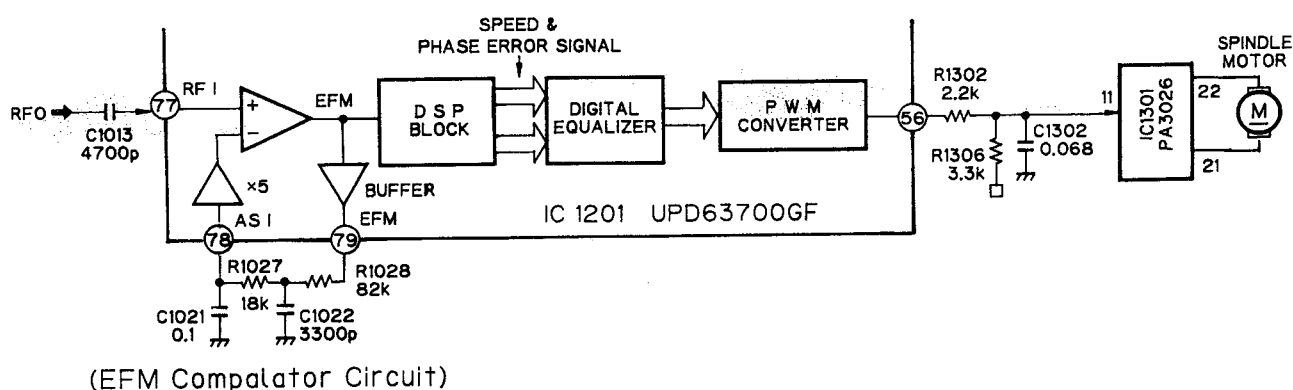
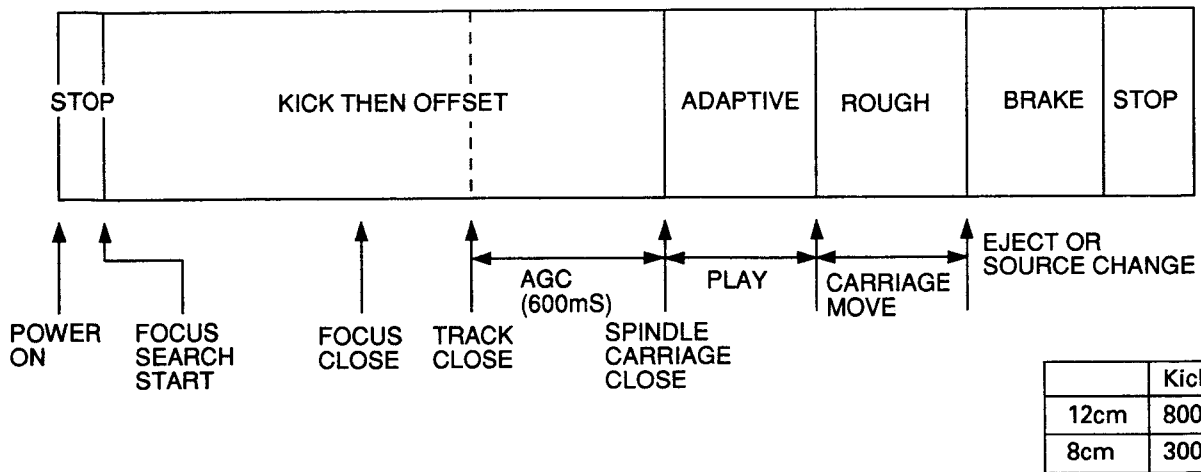


Fig.20 : SPINDLE CIRCUIT

• Normal Mode



• Test Mode

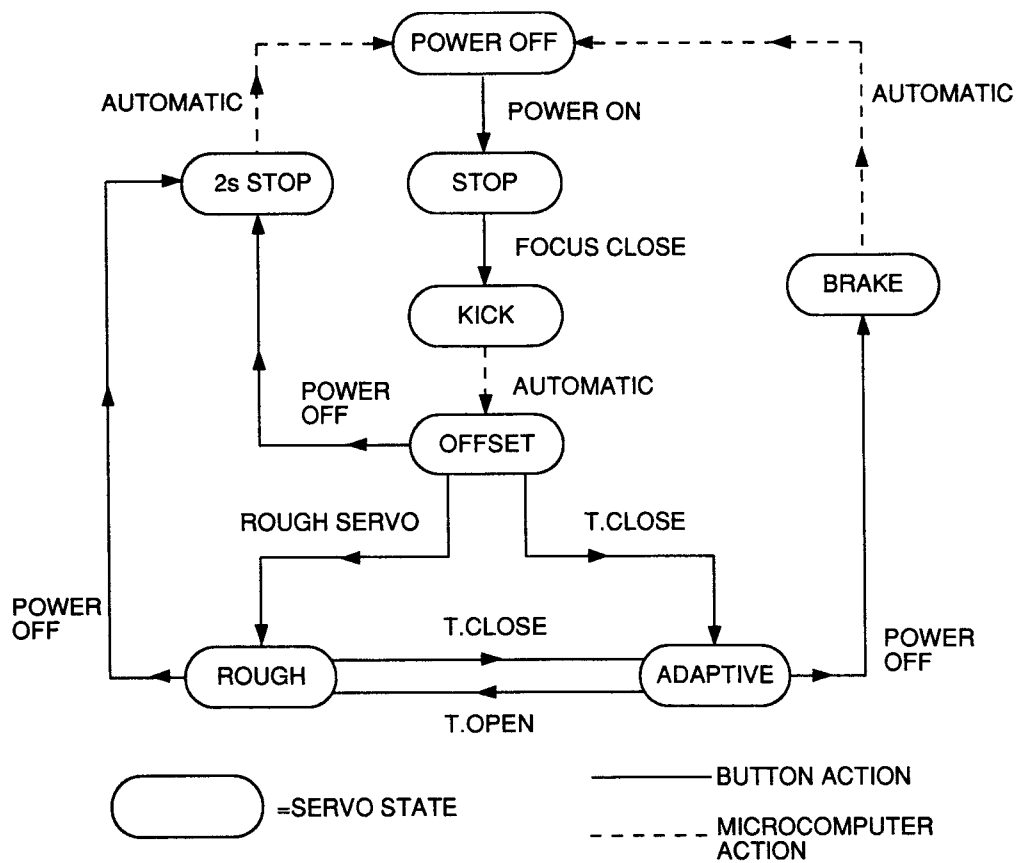


Fig.21 : SPINDLE SERVO MODES

5) Automatic Gain Control (AGC)

The servo LSI UPD63700GF contains a new function which allows the microcomputer to automatically adjust the gain of the focus and tracking servos every time a new disc is inserted or the CD source is selected. The block diagram of the AGC circuit is shown in figure 22. Basically, a small disturbance signal is inserted into the servo loop at a fixed frequency and the response of the loop is measured via the filtered signals G1 and G2. For a properly adjusted servo loop the amplitudes of G1 and G2 should be equal. The microcomputer reads in these values, does a simple calculation and adjusts the loop gain appropriately.

In order to achieve a high degree of accuracy this adjustment is performed a number of times.

As long as there is power supplied to the microcomputer it remembers the previous adjustment point and uses this as a starting point. Thus, should the system degrade with time (actuator sensitivity, dirt build-up, circuit degradation etc.) the microcomputer can follow this trend and keep the loop gain optimized. If power to the microcomputer is removed, it forgets the previous adjustment point and assumes a default value.

At shipping the CD player will be within 5dB of this default and no problems should occur. For an older player however this is not so and it is possible that servo closure may not take place immediately. In this case, the microcomputer adjusts the gain 'blind', searching for a stable point.

In TEST MODE, the result of the AGC can be monitored. Once tracking close (with AGC) has been performed the set can be made to display the present value of the gain block. The default value is displayed as '20', which is the value a typical PU unit, PCB & test disc would result in. If for some reason the loop gain had dropped by, say, 6dB (1/2 the typical value) then the gain block will be adjusted during AGC to twice it's default value ; resulting in a gain of '40'. Similarly a set with a loop gain twice the typical will display '10' as the present gain.

Using this, it is possible to 'measure' the loop gain of the servo without the need for any instrumentation. The players shipped from the factory are checked with a test disc so that the value of the gain block after AGC is within the range 11 - 45.

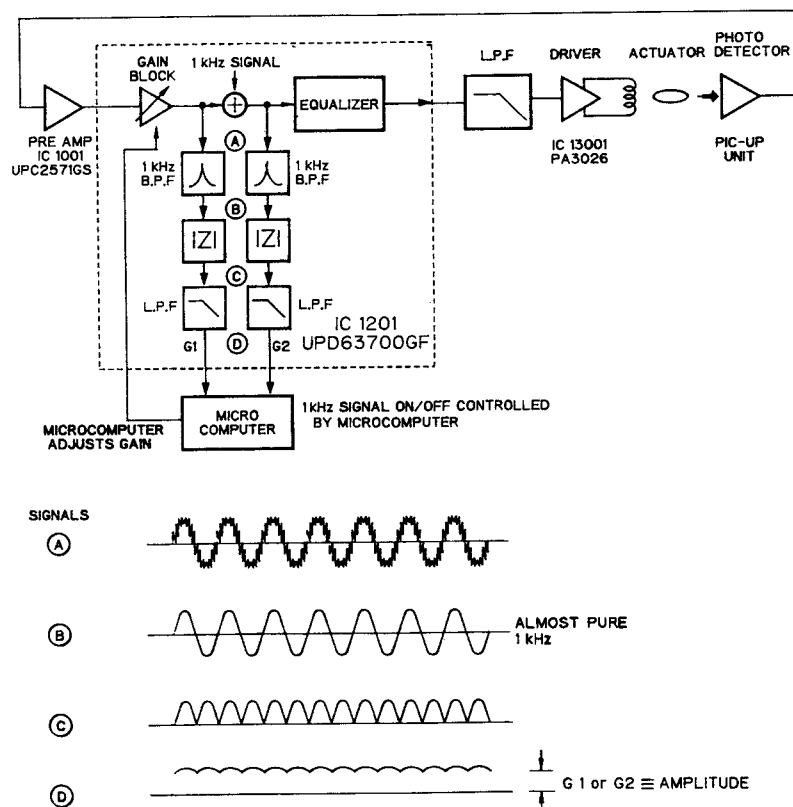


Fig.22 : AGC BLOCK DIAGRAM

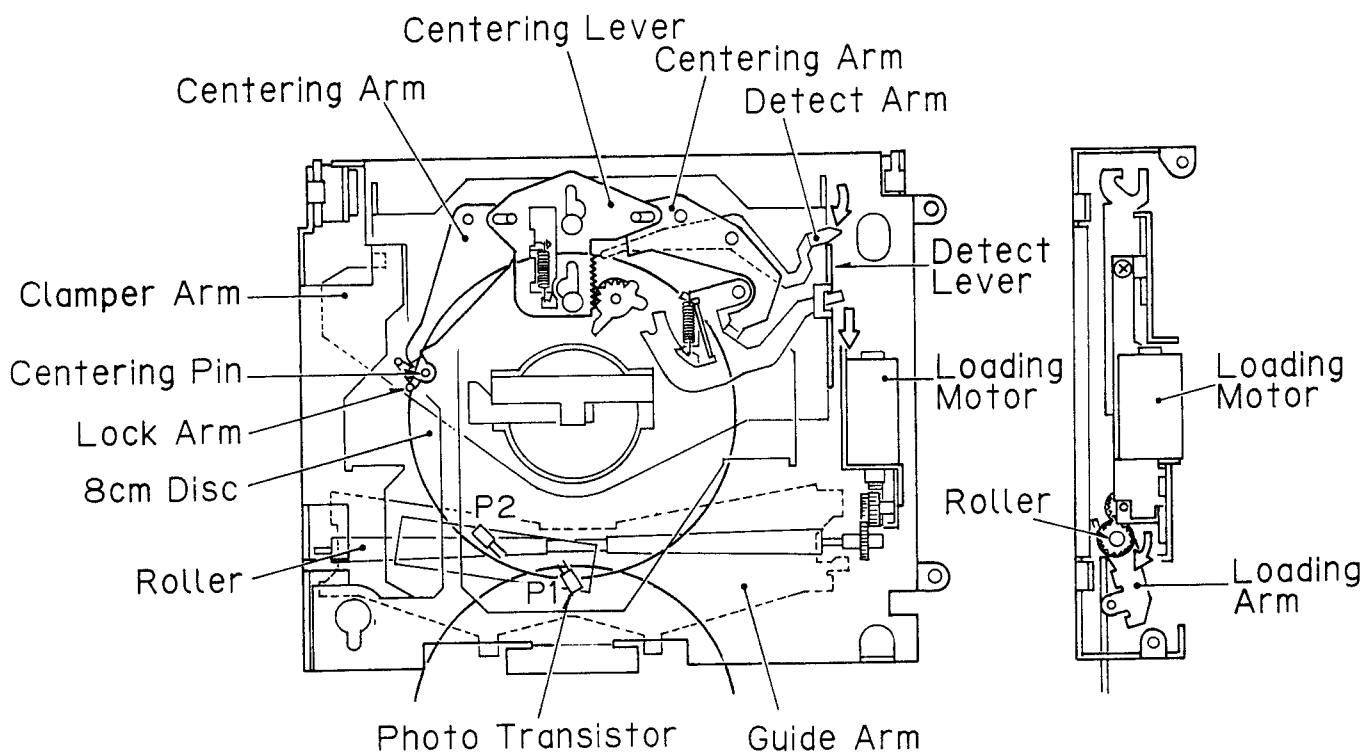


Fig.24

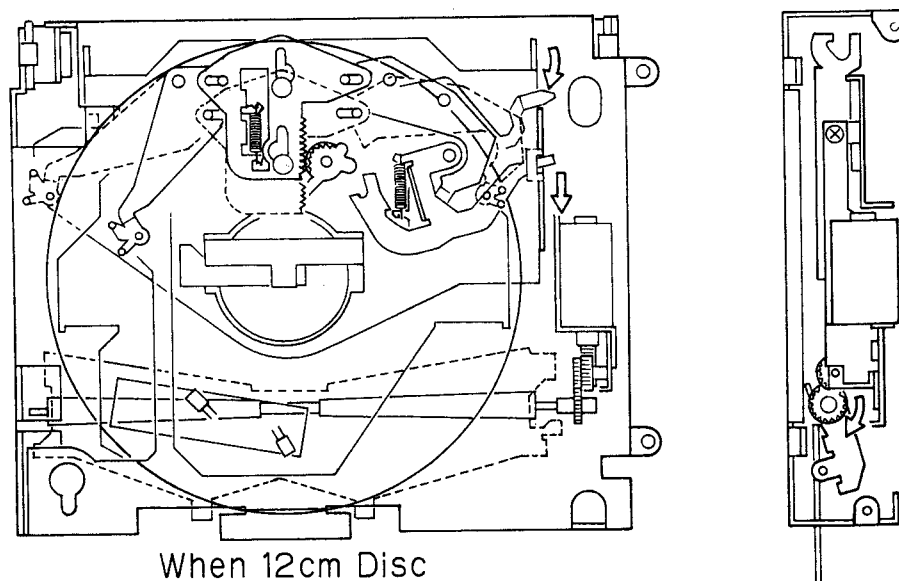


Fig.25

● Clamp Operation

1. The rack gear in contact with the detect lever is engaged with the gear driven by the loading motor, thereby moving the L arm in the arrow direction. The clamber arm, which had been raised by the L arm, moves down and clamps the disc.

The lock lever which interlocks with the L arm moves the loading arm.

As a result, the rubber roller is pushed down, leaving the disc. At the same time, the guide arm moves down, too. At the position where the lock lever turns the clamp switch on, loading comes to an end.

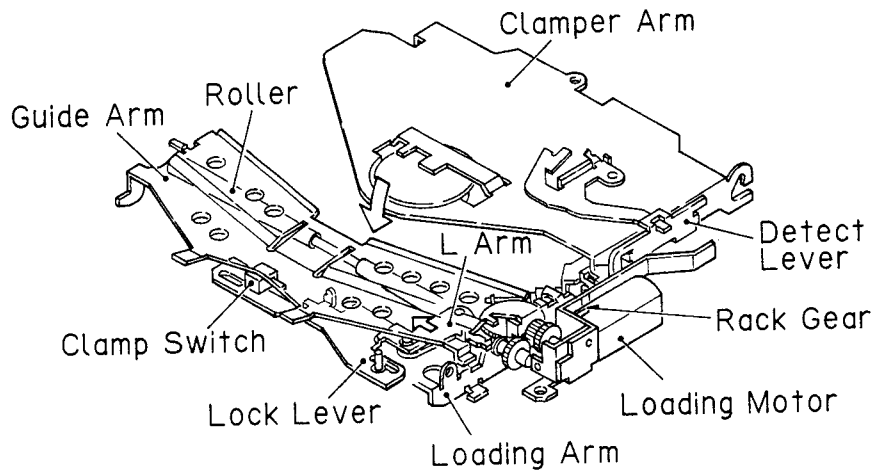


Fig.26

● Mechanism Lock

1. In the eject condition two lock arms are positioned in the frame hole and the front side of the floating section is locked in both vertical and horizontal directions.

The L arm moves the rotating lock lever to the left. The mechanical lock arms L and R move in the directions designated by the arrows and the floating section is released from the frame.

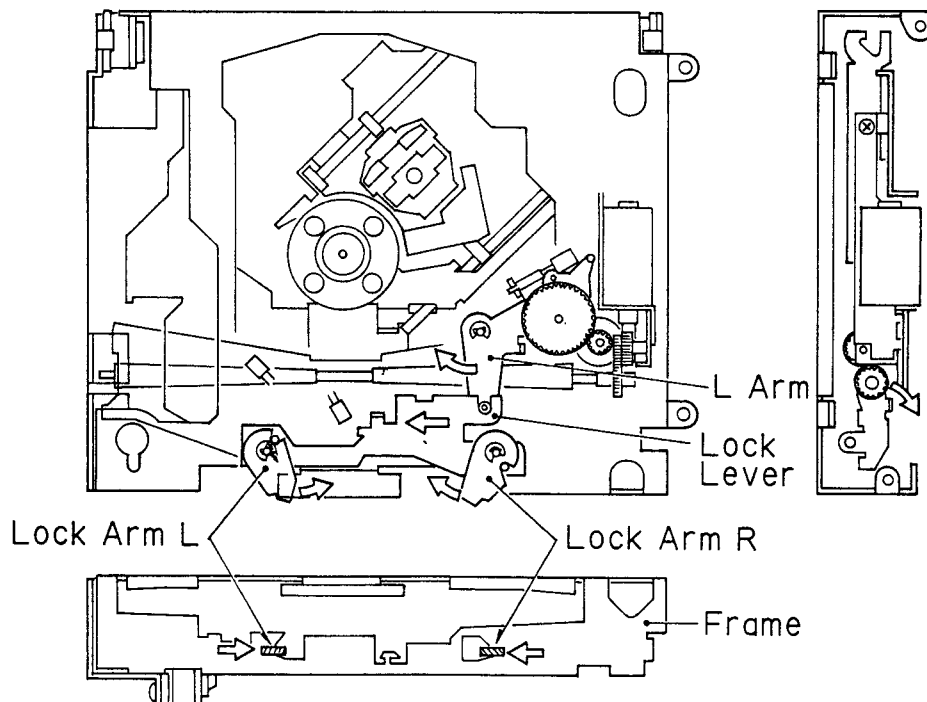


Fig.27

● Eject

1. The eject mechanism operates by reversing the rotation which takes place when the loading motor loads. The L arm moves and operates the mechanical lock, the clamp is released, the roller is applied, and the disc is conveyed. In the case of a 12cm disc the loading motor stops at the position at which the photo transistor lights at the rear of the rubber roller section.

However, in the case of an 8cm disc, motor revolution stops after a fixed period of time. In this process the disc type is recognized during play, by the voltage of the photo transistor(P1) located in front of the rubber rollers.

3. DISASSEMBLY

● How to Remove the Dampers

(Fig.28)

1. While keeping the CX-540 powered on, insert a disc and put it into play mode (with the arm unit lowered).
2. Power off the CX-540 while in play mode.
3. Unplug the connector and remove the CX-540.

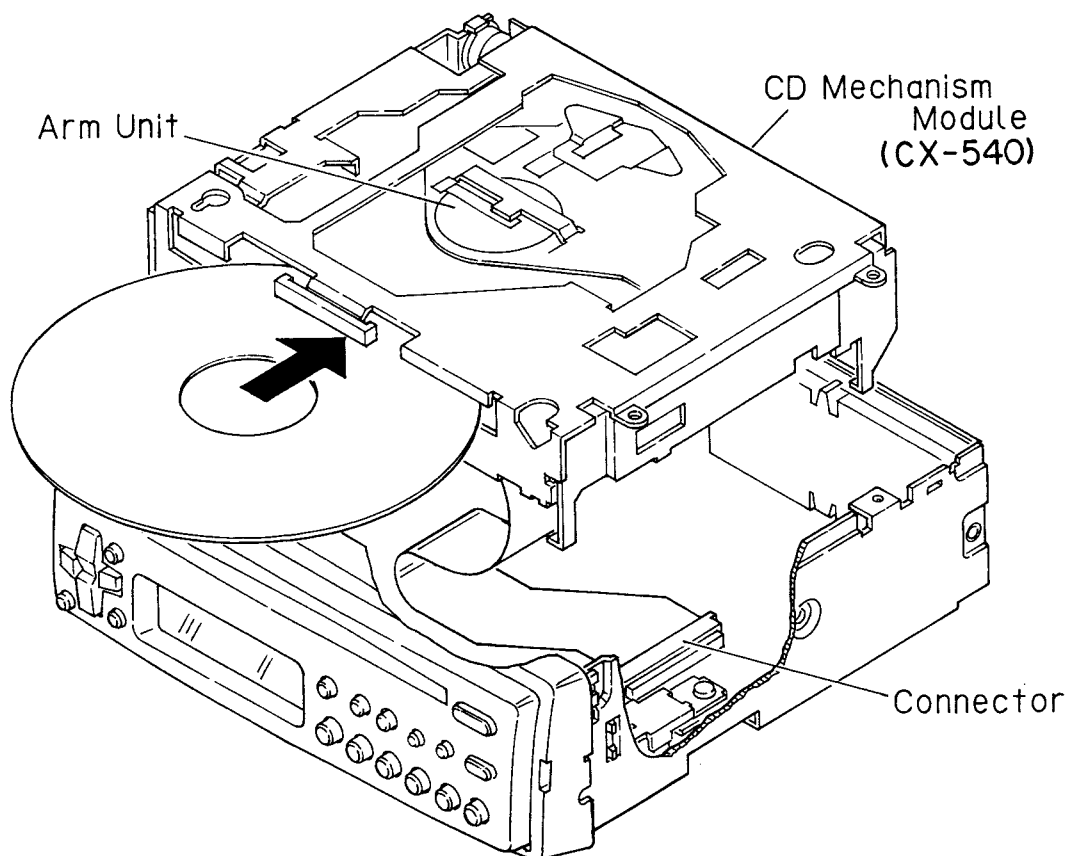


Fig.28

(Fig.29)

4. Unfasten the four screws marked with arrows.
5. Unfasten the two screws A and remove the frame.

6. Unfasten the two screws B and remove both damper and holder at the two locations.

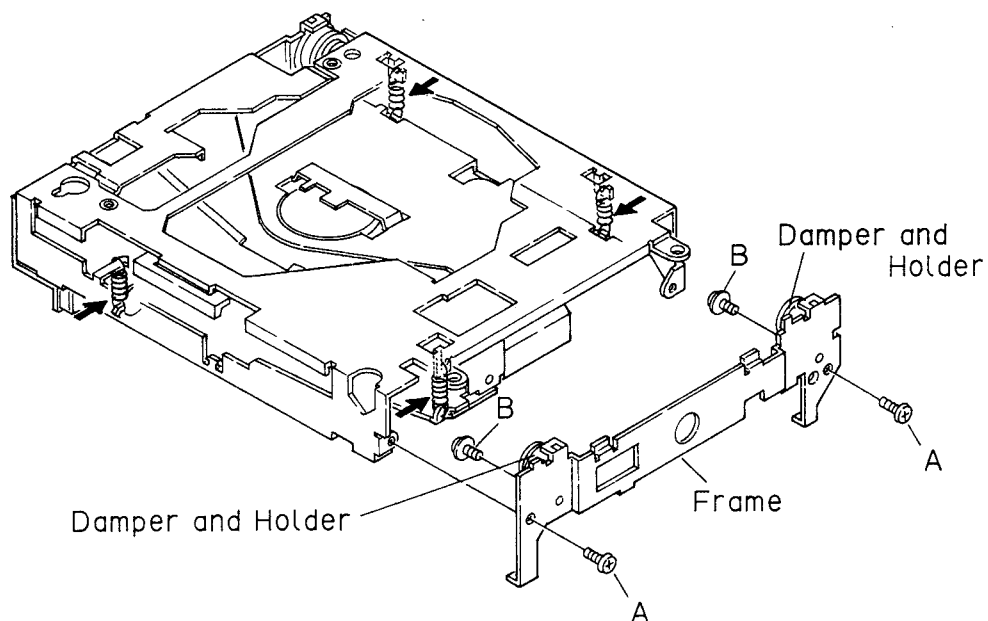


Fig.29

(Fig.30)

7. Remove the frame unit.
8. Unfasten the two screws and remove both damper and holder at the two locations.

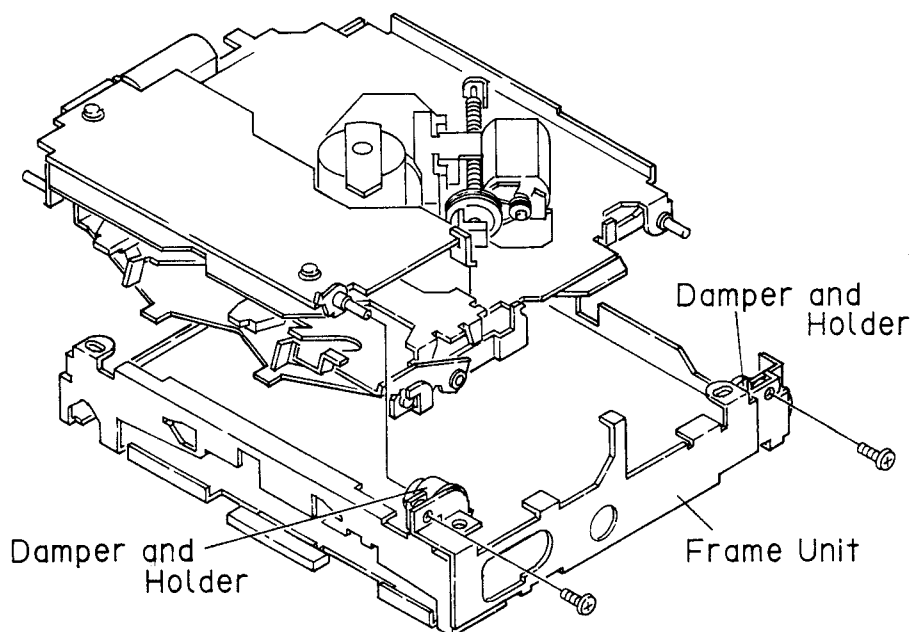


Fig.30

● How to Remove the Spindle Motor

(Fig.31)

1. Remove spring A as marked with an arrow.
2. Remove springs B and C and the arm unit.
3. Remove spring D and the lever.
4. Turn the support wheel so that the screw head becomes visible through the hole.
5. Unfasten the two screws and remove the spindle motor.

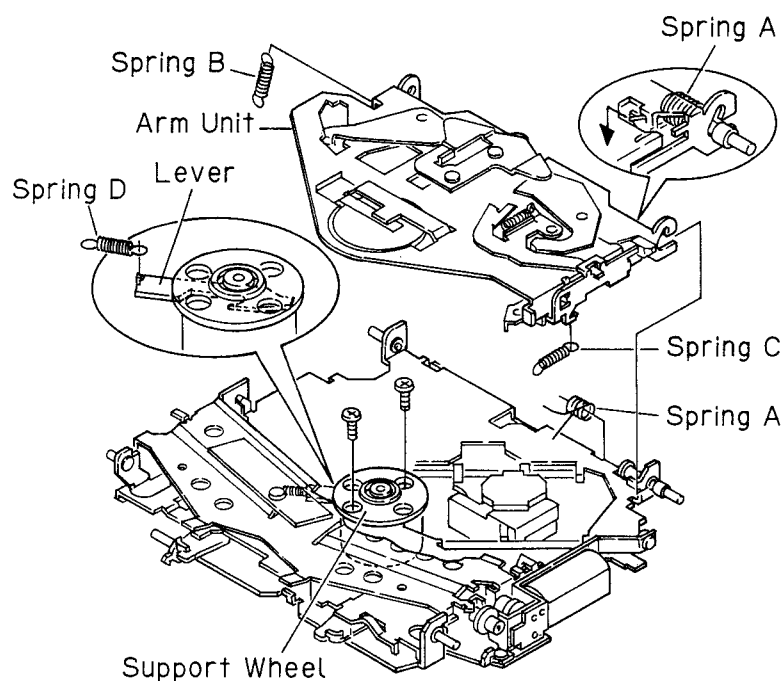


Fig.31

● How to Remove the Loading Motor

(Fig.32)

1. Remove the washer and the arm.
2. Remove the spring.

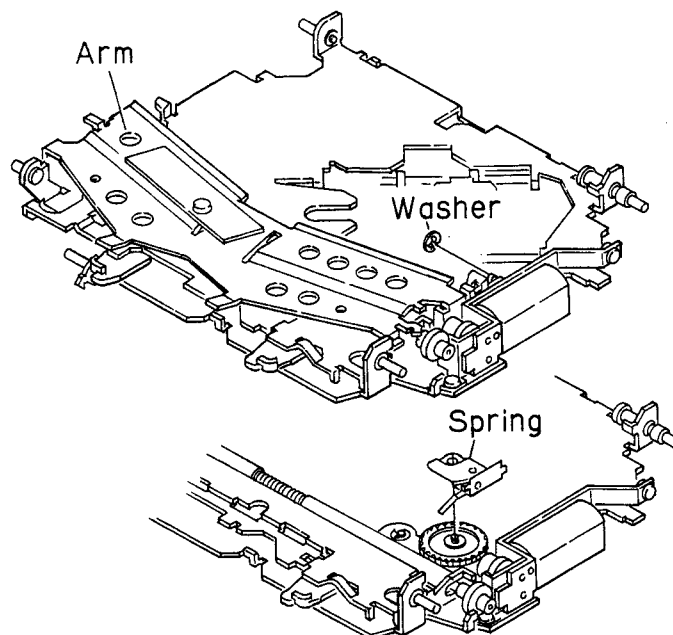


Fig.32

(Fig.33)

3. Unfasten the two screws and remove the bracket unit.

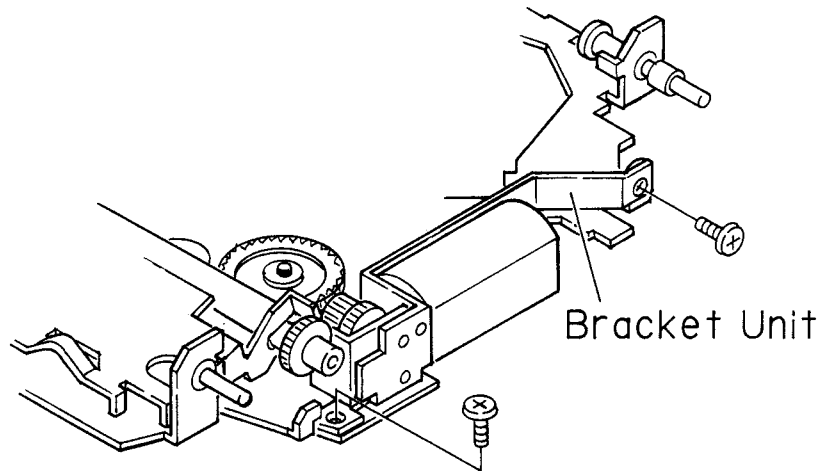


Fig.33

(Fig.34)

4. Unfasten screw C and remove both gear unit and gear.
5. Unfasten the two screws D and remove the loading motor unit.

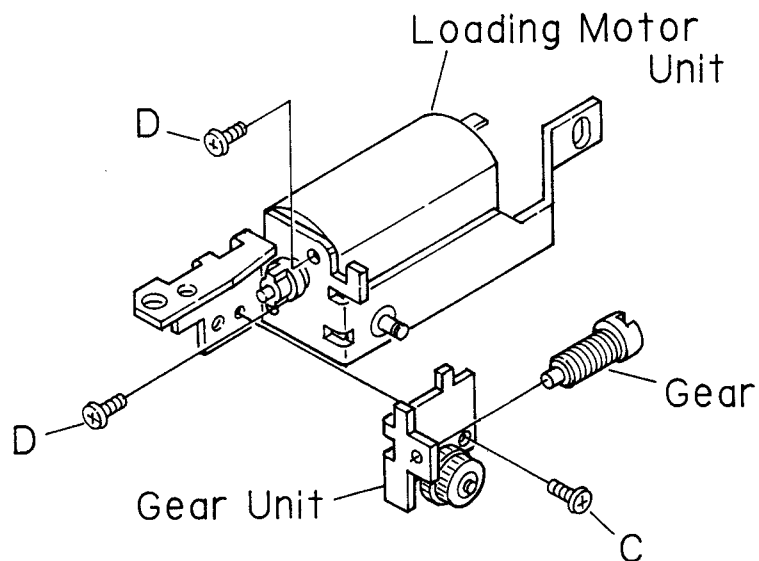


Fig.34

● How to Remove the PU Unit and the Carriage Motor

(Fig.35)

1. Latch spring E as marked with an arrow in the illustration.
2. Attach a short pin to protect the PU unit.
3. Unplug the connector.
4. Unfasten the screw and remove spring F.
5. Remove the PU unit.

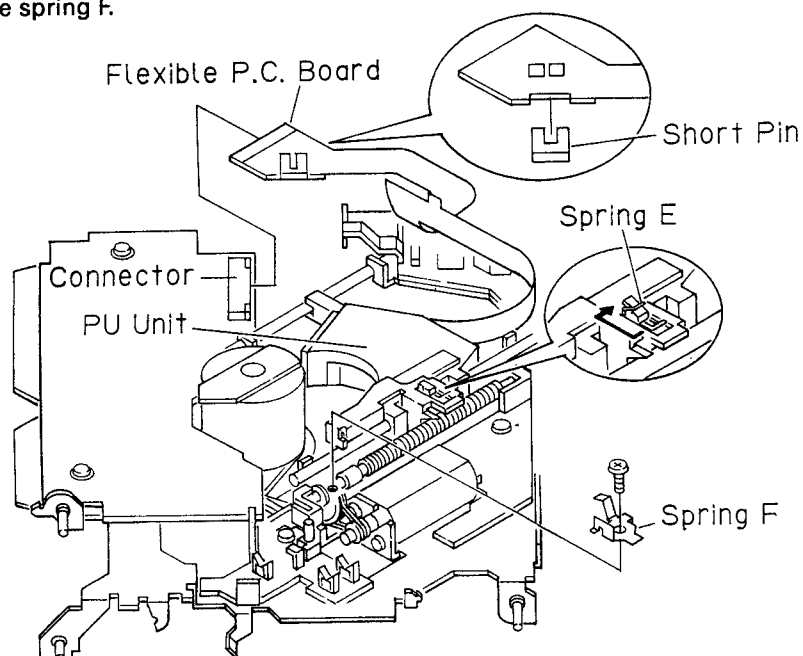


Fig.35

(Fig.36)

6. Unfasten screw E and remove the holder, belt and screw unit.
7. Unfasten the two screws F and remove the carriage motor.

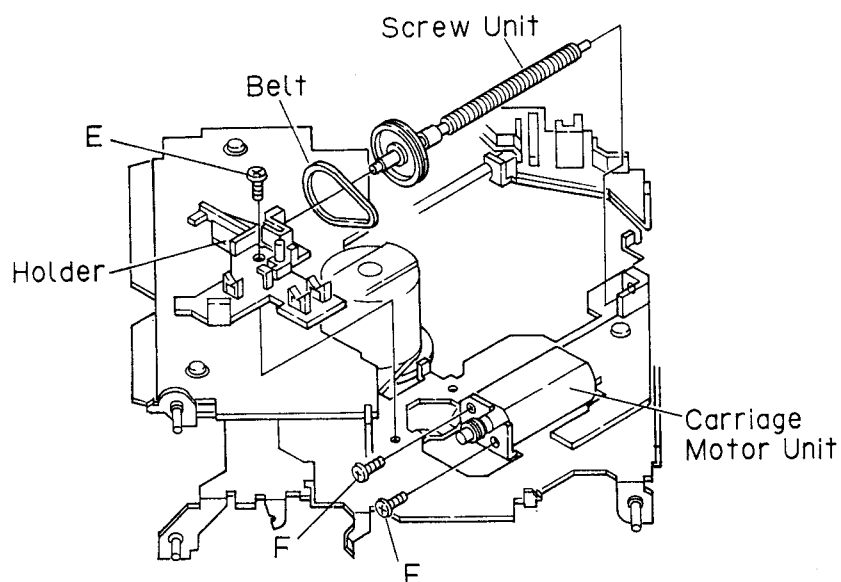


Fig.36